THE ART OF THE DOUBLE PLAY P. 12 • MARCO POLO MYTHS P. 82

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JULY 2008

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2009 Chevy Aveo5 2LT with available 15" 5-spoke aluminum wheels shown. Preproduction model shown. Actual production model may vary. Available summer 2008.

1 Based on EPA estimates and segmentation. 2 Based on 2008 GM Compact Car 3-Door Coupe segment. 3 Very limited availability. 4 Based on GM estimates. Official EPA estimates not yet available. 5 2008 Silverado 2WD with available 5.3L engine has EPA est. MPG 15 city/20 hwy. 6 Based on 2008 GM Large Utility segment and 2008 EPA estimates. Tahoe 2WD with available 5.3L V8 has EPA est. MPG 14 city/20 hwy. Excludes other GM vehicles. 7 Source: fueleconomy.gov. ©2008 GM Corp. Buckle up, America!

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The northern Italian city of Como is celebrated not only for its picturesque setting on one of Europe's deepest lakes, but also for its extraordinary silk

BY PETER ROSS RANGE
PHOTOGRAPHS BY SCOTT S. WARREN

Muir made detailed studies of the valley's geology, camped out on high ledges where he was doused by freezing waterfalls and once "rode" an avalanche down a canyon.

"JOHN MUIR'S YOSEMITE,"
PAGE 48

ON THE COVER The *Sea Stallion*, a replica, sails with a crew of 60 to 100, much as Viking warships did 1,000 years ago.

PHOTOGRAPH BY WERNER KARRASCH / VIKING SHIP MUSEUM, DENMARK

THIS PAGE El Capitan, the world's largest granite monolith, stands guard in Yosemite National Park, not far from where a young John Muir lived during short stints.

PHOTOGRAPH BY GARY CRABBE / DRR.NET

Smithsonian departments

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Setting up an outpost on the moon is to test "the belief that humans are destined to live in other places except earth," says John Logsdon, director of the Space Policy Institute.

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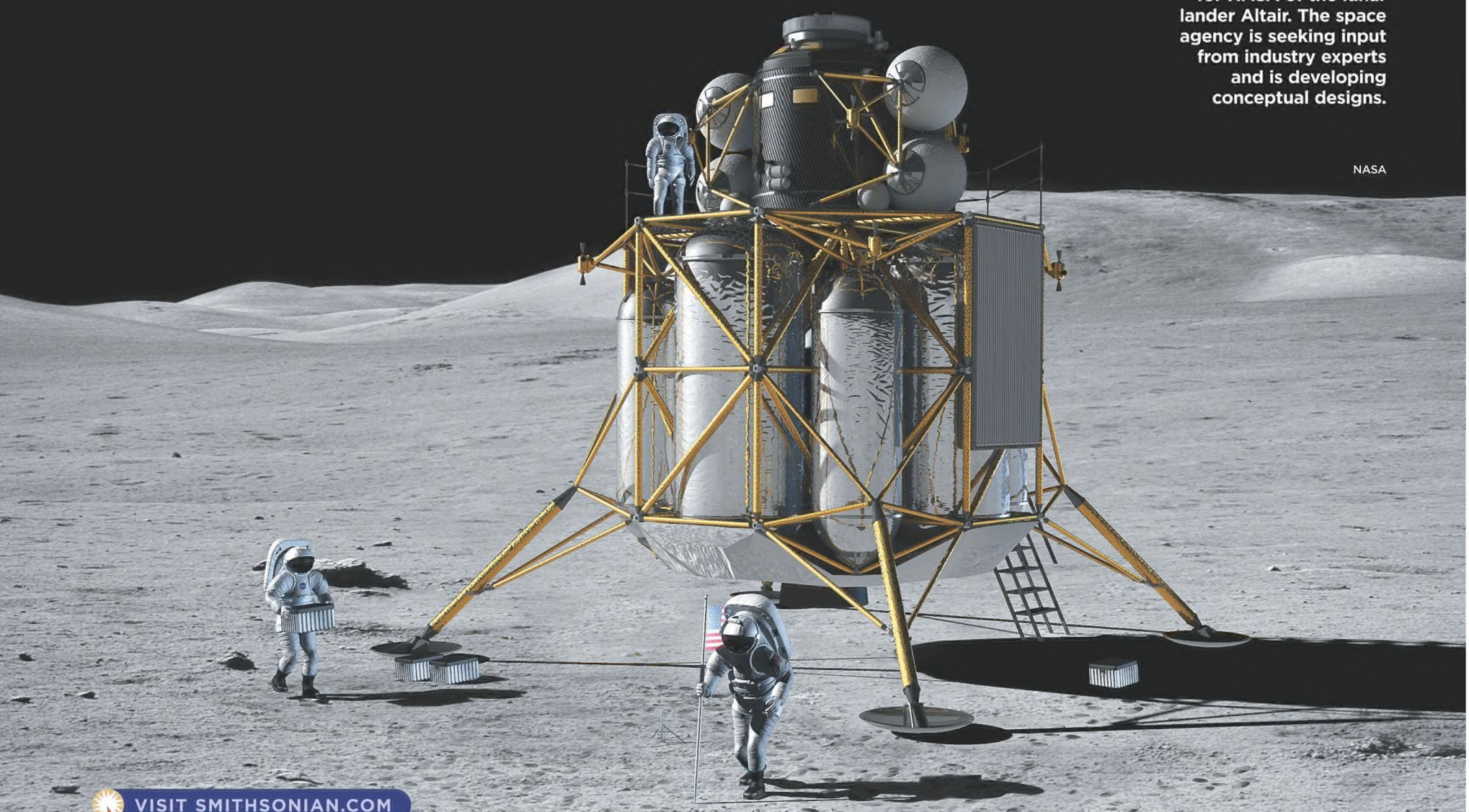

An artist rendering done for NASA of the lunar lander Altair. The space agency is seeking input from industry experts and is developing conceptual designs.

NASA

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ANGEL RODRIGUEZ / ISTOCKPHOTO

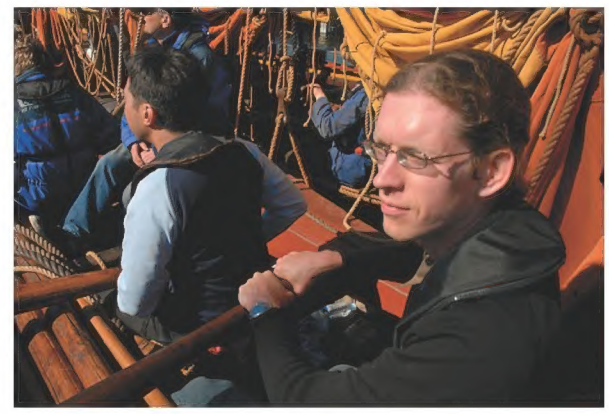
FROM THE EDITOR

Stouthearted Men

Brutal, yes, but also strong-willed

BY CAREY WINFREY

ANDREW CURRY first heard about plans to replicate a 1,000-year-old Viking ship and sail it from Roskilde, Denmark, to Dublin when he visited Denmark's Viking Ship Museum six years ago. He's been following the *Sea Stallion* "living-archaeology" project ever since. The idea behind it is to learn more about how the Norsemen were able to travel such long distances and what motivated them to do so. Curry, a freelance writer based in Berlin, visited the ship's crew in Roskilde last spring. "I think the real revelation for me," he says, "was how developed and extensive the Viking explorations were in the East. They had an incredible network in Russia, and there were Viking war parties that attacked Istanbul (then Constantinople) thousands of miles from home. They were ambitious, fearless and had to be well organized to be able to travel that far and be that aggressive."



Curry: "It must have been pretty intense."

Though perhaps not as aggressive as is commonly believed. Curry explains: "People have this perception of Vikings as bloodthirsty barbarians, killing people and then hopping on their ships and sailing away. They could be brutal, but what that stereotype overlooks is the organization and the willpower they had. Talking to the crew members in Denmark, I was reminded how difficult and dangerous it is to sail a ship like this on the open ocean today. And it was even more dangerous a thousand years ago. I asked one of the historians what would happen if a ship got into trouble back then, and he said: 'Well, they would pray to their gods.' That was about all they could do. Imagine just setting out from Scandinavia, sailing west and hoping that you would run into land somewhere. It must have been pretty intense."

Smithsonian magazine 6TH ANNUAL PHOTO CONTEST

SPEAKING OF INTENSE, we are starting our 6th annual Photo Contest a bit early this year, i.e. Now! It will run from July 1 to December 1, 2008. We're also introducing "Picture This," an online gallery that will display the editors' picks of photographs as they are received. Check it out at Smithsonian.com. (We'll update "Picture This" often.) This year, for the first time, we will accept submissions from professional photographers. We have also decided to increase the number of photographs each entrant may submit, though a fierce debate about the exact number continues to rage here at Contest Central. By the time this issue reaches your hands, we should know its resolution. Please visit Smithsonian.com for all the new rules and other contest information. And please keep those great photographs pouring in!

WERNER KARRASCH / VIKING SHIP MUSEUM, DENMARK

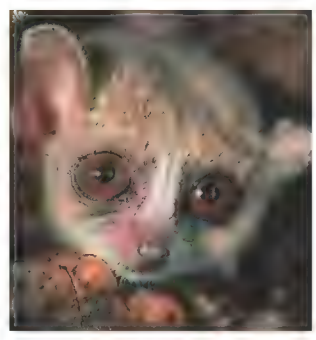
Observed

WILD THINGS

LIFE AS WE KNOW IT

BY AMANDA BENSEN, KENNETH R. FLETCHER, T. A. FRAIL, MEGAN GAMBINO AND JESSE RHODES

NAME: *Schistocerca gregaria,* or the desert locust.
WHAT'S ANCIENT: Plagues—or what scientists call mass migrations—during which billions of locusts take flight.
WHAT'S NEW: Insight into why locusts move in coordinated masses. It's not simply because they need to find greener pastures after eating everything in sight. It's because when they're hungry, they start eating each other. A recent University of Oxford study showed that juvenile locusts, which walk rather than fly, flee when they feel another locust nip their abdomen. As they run from the attack, other juveniles become alarmed, and soon all of them are on the move. The researchers suggest that cannibalism may also spur flying swarms.



YOO-HOO

How do species that look alike tell each other apart? Madagascar's gray, golden brown and Goodman's mouse lemurs—previously thought to be one and the same—play it by ear. Researchers from Germany discovered that the male of each species has a unique, ultrasonic mating call enabling females to detect suitable suitors. This is the first time look-alike primates have been shown to use vocalizations to identify mates.

ANOTHER HELPING

While in groups, animals from birds to mongooses employ a lookout that makes a sound every few seconds to signal that all's well. Now University of Bristol researchers have demonstrated for the first time that a sentinel's call encourages birds to eat more. Pied babblers, native to the Kalahari Desert, spent less time looking for predators and more time eating when the researchers played a recorded call. All adults take turns as sentinel; the researchers call it cooperation.

CORAL COMEBACK

Fifty years after U.S. atomic bomb tests obliterated three of Bikini Atoll's islands and heated the ocean surface to 99,000 degrees Fahrenheit, corals are recovering. Australian marine biologists recently counted 183 types of coral around the atoll's reef and lagoon, or about 70 percent of the species present before the explosions.

WHERE SUNFLOWERS WERE FIRST SOWED

Scientists long thought sunflowers were first domesticated in the Mississippi Valley 3,200 years ago. But University of Cincinnati-led researchers found sunflower seeds in Tabasco, Mexico, that are 4,600 years old and too large to be wild. People likely cultivated the plants for food and later used them in medicines and rituals.

Listen to mouse lemurs and pied babblers at Smithsonian.com/WildThings

CLOCKWISE FROM TOP RIGHT: ARCO IMAGES GMBH / ALAMY; ROBERT GEORGE YOUNG / PHOTOGRAPHER'S CHOICE / GETTY IMAGES; SILVIA PINCA; ANDY RADFORD; HELLIO & VAN INGEN / NHPA

LETTERS READERS RESPOND TO THE **APRIL** AND **MAY** ISSUES

In her piece about New York City ["You Got a Problem With That?"], Joan Acocella presumes that eagerness to dispense unsolicited opinions is a manifestation of smartness. To the contrary, it mainly displays arrogance. One thing she says is true: "Living with [New Yorkers] is a little like being a child again and having your mother with you . . . helping you, correcting you, butting into your business."

MAUREEN MARTIN, FORT BRAGG, CALIFORNIA

UNINTELLIGENT NEW YORKERS

HOW APPROPRIATE that Joan Acocella's essay, which espouses New Yorkers' rudeness as a mark of intelligence, should be followed by Cristián Samper's column [From the Castle: "GNP or GNH?"] about Bhutan's philosophy of "gross national happiness" as the best measurement of a nation's performance. To propose that New Yorkers are smarter than other Americans because they have "higher ambition" and are "intent on long-term gains," as Acocella puts it, flies in the face of the view that wisdom and happiness have nothing to do with money, aspirations, accomplishments or the opportunity to show off one's expertise (all manifestations of ego). Many New Yorkers are friendly and helpful. But to subject oneself to the daily bombardment of overstimulation, of the me-first, get-it-before-somebody-else-does mentality, for the sake of acquisition, would not be considered intelligent by the Bhutanese. As a resident of the rural Midwest, I can imagine that when the heat, air conditioning and elevators quit because the grid goes down, when the meat and vegetable trucks stop arriving because the oil runs out, the residents of New York City may be willing to trade their appearance of intelligence for a dumber way of life.

SCOTT TAYLOR
NOBLE, ILLINOIS

LBJ'S DECISION

THE GENERAL assumption is that President Johnson's public decision of March 31, 1968, not to run for re-election was a complete surprise and perhaps impulsive ["The Unmaking of the President," by Clay Risen, April 2008]. This is not true. The whole story has not been told. On the night of the November 3, 1964, presidential election, when the results were clear, President Johnson telephoned newly elected Vice President Hubert Humphrey in Minneapolis and asked him to fly to Johnson's ranch in Texas the next morning to begin to discuss some of the issues they would confront in Washington. I, too, was in Minneapolis, and Humphrey invited me to join him on the flight. The day was filled discussing substantive issues, as well as personnel problems. During the visit, it became necessary for me to inform the president that I would not join either his staff or the vice president's—an embarrassing task.

On a flight to Washington, Humphrey asked me to sit next to him. Pledging me to secrecy, he told me that the president had informed him that he would not run for re-election at the end of his term and that he and Humphrey should prepare themselves for a Humphrey presidency in four years. When I asked why the president would serve only one term, I learned that Johnson was concerned about his heart problems, which he felt might prevent him from finishing the term and would likely not permit him to continue in office following his current presidency. He did not want to die in office.

During the four-year Johnson-Humphrey administration, the president apparently reaffirmed the need for Humphrey to prepare. Prior to Johnson's announcement in 1968 that he would not run for re-election, he visited the Humphreys in their apartment. The president said he would make the formal announcement that he would not run and suggested that Humphrey prepare himself for the election.

Shortly afterward, I gathered a number of political friends to begin to plan for the forthcoming campaign. James Rowe, a close associate of Johnson's, joined that group and made it very clear to me that he did so with the president's approval, evidence that Johnson supported Humphrey's bid for president. So much for the theory that Johnson was

ARNOLD NEWMAN / LBJ LIBRARY

not enthusiastic about Humphrey succeeding him as president.

MAX M. KAMPELMAN
FORMER HEAD OF THE U.S. DELEGATION TO THE CONFERENCE ON SECURITY AND COOPERATION

CLAY RISEN RESPONDS:

I DON'T DOUBT that Hubert Humphrey told Mr. Kampelman about a confidential plan by Lyndon Johnson not to run again in 1968. What I do doubt is whether Johnson kept to that plan for more than a few days and whether his statement was thereafter taken as a standing fact by Johnson and Humphrey, and perhaps by others. This was, after all, the sort of thing Johnson did all the time. In early 1964, he had expressed concern about running for even that year's election. And throughout his first full term, particularly at moments of crisis or failure, Johnson would tell a trusted adviser—his wife, say, or Texas Governor John Connally—that he had decided not to run in 1968, only to change his mind later. In other words, announcing the end of his career was a psychological game for Johnson, one he was probably playing with Humphrey on that day in November 1964.

What's more, according to numerous aides, up until the day of his withdrawal on March 31, 1968, Johnson gave every indication that he intended to stand for re-election—he had hired a campaign staff, named a campaign director and ordered tens of thousands of campaign bumper stickers. Maybe this was all a ruse. But White House aide James Jones attests that when Johnson gave Humphrey his withdrawal speech on the morning of the 31st, the vice president began to cry. Clearly, taking over the campaign wasn't something Humphrey had prepared himself to do.

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It's in the Bag

Sports Illustrated photographer Neil Leifer hit a grand slam when he set out to capture a double play on film **BY OWEN EDWARDS**

MORE THAN THE HOME RUN, more than the strikeout, the double play distills the physicality of baseball. The instant the ball is hit, the fielders strive for timing and precision; the base runners strive for speed and disruption. When the lead runner launches himself cleats-first toward second base, it's like flashing a switchblade during a pas de deux.

Neil Leifer may appreciate the moment more keenly than even some of the countless major leaguers who have executed the double play over baseball generations. In 1965, Leifer figured out how to get a worm's-eye view of one. His ingenious methodology yielded just one image, but that was enough to capture what no photographer had captured before.

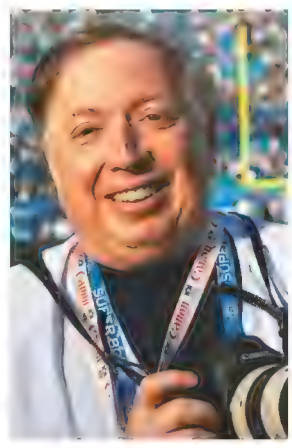
Leifer is both an artist and a techie, with an eye for iconic moments and a head for inventing ways to capture them. When the Houston Astros started playing in a domed stadium in 1965, he was quick to realize that he could shoot from a gondola mounted directly above the diamond—and did, to stirring effect. Using *Life* magazine's gargantuan 2000-millimeter lens in the late 1960s, he stationed himself in the center field bleachers to focus on where the pitch reached the catcher's mitt, a vantage point now standard for TV broadcasts. "Neil was the photojournalistic equivalent of Al-

Leifer's "handy" father helped rig the camera that caught the Dodgers' Willie Davis in mid-slide.

"We got the shot," says Leifer (below: in 2005), but Tony Taylor (No. 8) got Davis out. Davis' slide knocked the camera from the bag.

fred Hitchcock, with shots like the overhead angle in *Psycho*," says Gabriel Schechter, a writer who contributed to a new collection of Leifer's baseball pictures, *Ballet in the Dirt: The Golden Age of Baseball*.

Born in New York City in 1942 and raised on the Lower East Side of Manhattan, Leifer grew up watching ballgames with his father, Abraham, a postal worker, at the Polo Grounds (home of his father's beloved Giants) and Ebbets Field (home of the Dodgers). Leifer remembers taking a picture of Jackie Robinson on Camera Day at a Dodgers game when he was 13. The young photographer received training in technique at the Henry Street Settlement in New York and began selling photos as a teenager. At 18, he scored his first *Sports Illustrated* cover (of New York Giants quarterback Y. A. Tittle).



Leifer almost had to align the planets to get his double-play photograph at Dodgers Stadium, in Los Angeles, on April 25, 1965. He had brought his father to the game to watch the Dodgers take on the Philadelphia Phillies. "It was his first trip to the West Coast," Leifer says. "Dad hadn't yet gotten over the Dodgers and the Giants moving to California, but it was a thrill for him to be there anyway." Abraham Leifer was "handy at building stuff," so the photographer asked him to put together a small wooden box that could be put into a space carved out of the padding in the second base bag. Into the box went a Leica connected—through wires buried a few inches under the infield dirt—to a remote release behind first base. (Dodgers officials, Leifer says, were keen to cooperate with *Sports Illustrated*, and seemingly indifferent to any travails this imposed on the groundskeepers.) "I used a 21-millimeter lens"—a wide-angle lens—"because I wanted to get the stands as well as the play," Leifer recalls. "My father actually had the remote release, while I was shooting with another camera."

A classic double play developed in the third inning. With Willie Davis—the Dodgers' great center fielder and then the fastest man in baseball—on first, batter Tommy Davis poked the ball to the infield. With perfect timing, Leifer *père* hit the remote release and caught Willie Davis launching into his slide toward the fielder's foot.

"We got the shot," Leifer recalls. But Davis hit the bag so hard he knocked the Leica out of place, so "that picture was the only one we got." (For the record, the Phillies got the two outs, and eventually the win, 6-4.) The image went unpublished in *Sports Illustrated*—it "just didn't fit into a particular story," Leifer says—and so makes its print debut in *Ballet in the Dirt*.

Did Davis see the camera? "No, I couldn't pay attention to stuff like that," he says. "I put a notebook together of all the ways to slide, so when I slid into base, I put everything together in a split second. In my mind, it was as if I'd already done it before I did it." Davis, 68, retired from the majors in 1979 and lives in Burbank, California, near his old team's stadium.

Leifer shot for *Sports Illustrated* from 1960 until he left in 1978 to make his mark photographing everything from politics to wildlife for other titles in the Time-Life family. His dad died in 1982. By the time the younger Leifer left Time Inc. in 1990 (to concentrate on filmmaking, both documentaries and shorts), he had produced more than 200 covers for the company's magazines—and an archive that suggests nobody got inside baseball better than he did.

OWEN EDWARDS *is a frequent contributor to* SMITHSONIAN.

NEIL LEIFER (2); PP. 12-13 NEIL LEIFER

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THIS MONTH IN HISTORY

JULY ANNIVERSARIES

MOMENTOUS OR MERELY MEMORABLE

BY ALISON McLEAN

420 YEARS AGO
BRITAIN WAIVES THE RULES

Queen Elizabeth I's English fleet takes on the Spanish Armada, July 31, 1588. Nine days later the Armada—part of King Philip II's plan to invade Britain and restore Catholicism—turns tail, its defenses disrupted by British ships set afire and aimed at it. The battle is won, though England and Spain remain at war until 1604.

90 YEARS AGO
ROYAL BLOOD

Former Czar Nicholas II, his wife, Alexandra, and children Olga, Tatiana, Maria, Anastasia and Alexei—detained by the Bolsheviks since Nicholas' abdication the year before—are executed in Yekaterinberg, July 17, 1918, to prevent rescue by White Army forces nearby. After decades of rumors of survivors, remains of the czar, czarina and three children are exhumed in 1991; in 2008, DNA analysis identifies the two remaining children.

50 YEARS AGO BLASTOFF

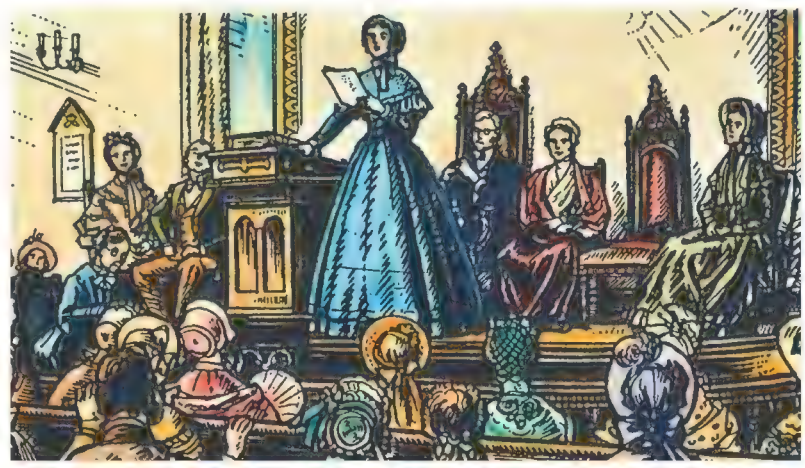
With the space race accelerating after the Soviet *Sputnik I* launch, President Eisenhower signs the National Aeronautics and Space Administration (NASA) into existence, July 29, 1958. "We may find that the road to lasting peace truly lies through the stars," says Senate Majority Leader Lyndon Johnson. By 2008, NASA will launch over 100 manned spaceflights and make discoveries that lead to improved highway safety, medical technology and intensive care monitors.

110 YEARS AGO "A BULLY FIGHT"

Battling alongside the regular U.S. Army against Cuba's Spanish occupiers, Theodore Roosevelt leads his volunteer cavalry of "Rough Riders" in charges up Kettle and San Juan hills, near Santiago, Cuba, on July 1, 1898. Their exploits help win the hills and the Spanish-American War, which ends days later. Roosevelt is a hero and returns to a revitalized political career. In 2001, 82 years after his death in 1919, he is awarded the Medal of Honor for his valor in Cuba.

160 YEARS AGO RIGHTS OF WOMAN

America's first women's rights convention is held in Seneca Falls, New York, July 19-20, 1848. Organizers (below: Elizabeth Cady Stanton) issue a list of grievances, from disenfranchisement to unfair child custody laws, and resolve to demand equality. Their declaration is met largely with derision—"Where, gentlemen, will be our dinners?" asks the Oneida *Whig* newspaper—and it is 72 years before the 19th Amendment gives women the vote.



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CLOCKWISE FROM TOP RIGHT: ULLSTEIN BILD / GRANGER COLLECTION, NEW YORK; NASA; CORBIS; GRANGER COLLECTION, NEW YORK (2)

Around the Mall

SCENES AND SIGHTINGS FROM THE SMITHSONIAN MUSEUMS AND BEYOND

ROBERT SEALE

MISSION: POSSIBLE?

A DARING PLAN TO PUT SETTLERS ON THE MOON WILL BE A HIGHLIGHT OF THIS YEAR'S SMITHSONIAN FOLKLIFE FESTIVAL, CELEBRATING NASA'S 50TH ANNIVERSARY

PAGE 19

"Crew comforts" are of utmost importance to NASA engineer Robert Howard Jr., who designs lunar living quarters.

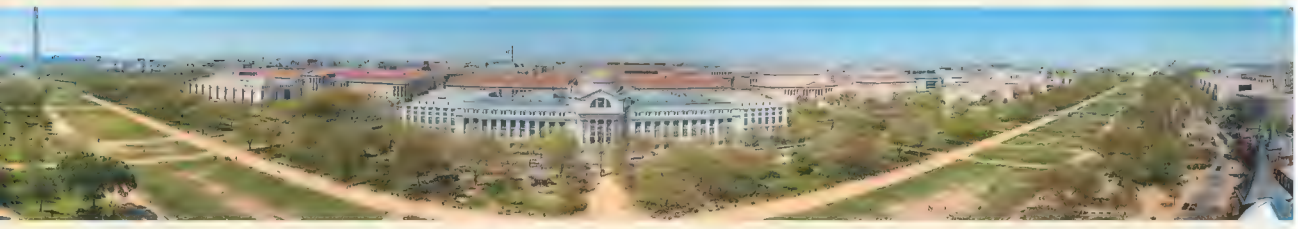
From the Castle p. 18
Jukebox p. 19
The Object at Hand p. 20
What's Up p. 22

FROM THE CASTLE | A Look Forward

G. WAYNE CLOUGH

FROM ITS EARLY DAYS in the 1850s, when a single building housed science laboratories and collections, the Smithsonian Institution has expanded to 19 museums, 9 research centers (some far from our nation's capital) and 158 Smithsonian Affiliate museums and educational organizations, located all over the country and beyond. The Smithsonian is the world's largest museum and research complex. So it is with profound humility and pride—and with much appreciation for Acting Secretary Samper's invaluable advice and assistance—that I take up my duties as the 12th Secretary.

Having served as the president of a research university—the Georgia Institute of Technology—I have a special appreciation for the Smithsonian's position as a revered cultural institution that faces challenges in a rapidly changing world. Questions abound: How should we address the huge costs of maintaining our buildings, several of which are national historic treasures? How do we keep the Smithsonian great? How can an organization with a reputation for authoritative scholarship best communicate to a generation that increasingly relies on blogs and questionable Web sites for information? How can we extend the excitement of the Smithsonian's scientific and other research work to a wider audience? I look forward to working with the Board of Regents, the National Board and other advisory boards, the staff and volunteers, our donors and all others involved with the Smithsonian to chart a course that builds on the Institution's great foundations and takes advantage of its opportunities. I hope to visit all of the Smithsonian's facilities in my first six months—to listen and to learn.



Challenging view: to extend the Institution's excitement to a wider audience.

The future offers remarkable opportunities. As diverse as the Smithsonian Institution is, its components share unifying characteristics—education, scientific discovery and scholarship; documentation of our nation's history, arts and culture; commitment to excellence; and relevance to the issues of the day. A new strategic plan focusing on the future will build on deeply held commitments, values, themes and aspirations. The Smithsonian is especially well suited to integrate knowledge across disciplines in a world where the major issues are interdisciplinary. The explosive growth of new methods of communication will enable us to use our vast collections to more effectively educate new generations here and around the globe about our nation's unifying traditions and heritage. Those collections articulate the many stories of the American people and speak with unique power to the special vigor that diversity gives the United States.

We will call upon these strengths to create a new wave of support for the Smithsonian, which truly deserves our best efforts, to ensure that it continues to be exciting, educational and relevant as it helps to inform, even transform, our nation's future.

G. WAYNE CLOUGH *is Secretary of the Smithsonian Institution.*

Smithsonian Institution

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G. Wayne Clough

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SAM KITTNER

LUNAR LIVING

THE QUEST TO RETURN TO THE MOON IGNITES NEW HOPE AND VISION AT THE 50-YEAR-OLD SPACE AGENCY

THE UNASSUMING LOG CABIN has long symbolized the American drive to tame and settle the frontier. But if aerospace engineer Robert Howard Jr., age 36, is successful, 21st-century settlers will live in a dwelling that might resemble an oversized balloon or soup can. As manager of the "habitability design center" at NASA's Johnson Space Center in Houston, Howard is helping to create a dwelling that could comfortably house four people on the moon for at least half a year. He is one of many NASA employees who will be speaking at this year's Smithsonian Folklife Festival (from June 25 to 29 and July 2 to 6, on the National Mall in Washington, D.C.), which will commemorate the space agency's 50th anniversary.

Howard says this is a heady time to be working at NASA. In 2004, President Bush set a goal of sending humans back to the moon by 2020 and eventually on to Mars. The lunar outpost would be a training ground and launchpad for trips to the red planet.

But there are plenty of challenges to overcome first. To camp on the moon, astronauts need to be shielded from solar radiation. In a waterless environment every drop of H_2O, including sweat and urine, must be recycled and purified. NASA engineers are sorting through dozens of possible models for the lunar outpost—from horizontal, aluminum cylinders to inflatable structures that are essentially giant, Kevlar-reinforced balloons.

Whether NASA will reach its goal for "boots on the moon" depends on support from future presidents and Congress. In 1989, President George H. W. Bush announced a similar goal of sending people to the moon and on to Mars, but it was scrapped after Congress balked at the high cost.

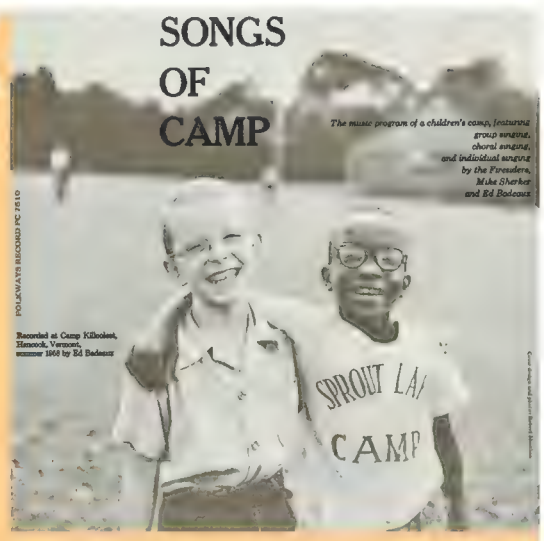
The next generation of NASA spacecraft (artist rendering) will carry more people and supplies than the Apollo missions.

And some scientists oppose manned missions. Steven Weinberg, a physicist at the University of Texas and a Nobel laureate, says space research generally can be done with robotic probes for a fraction of the cost. "Unmanned missions have been tremendously important in making this a golden age of astronomy," Weinberg says, while manned space exploration "costs hundreds of billions of dollars and doesn't serve any important purpose."

But setting up an outpost on the moon is an essential step toward eventually settling other planets, argues John Logsdon, director of the Space Policy Institute at George Washington University, who will join the Smithsonian Air and Space Museum this fall. "It's not primarily about science," Logsdon says. "It's to test the belief that humans are destined to live in other places except earth."

Howard echoes that sentiment. "Space symbolizes freedom and opportunity," says the NASA lunar architect, who was an avid *Star Trek* fan at age 3. "There is an entire universe out there for you to explore. . . . I call it 'space, the unlimited frontier.'" —KENNETH R. FLETCHER

JUKEBOX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Recorded at Camp Killooleet, Hancock, Vermont, summer 1958 by Ed Badeaux
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MEMORABLE MELODIES Like roasting marshmallows to make s'mores, a good summer camp song bridges generations. Musician Ed Badeaux recorded the Folkways album "Songs of Camp" in 1958 while working at Camp Killooleet in Vermont. Every evening after dinner, all 180 campers gathered for 45 minutes of singing along with Badeaux's banjo. In his opinion, nothing created "real closeness of spirit and soul" like people singing around a campfire. Fifty summers later, the tunes are still familiar. Hear "Sipping Cider," "Wimoweh" and "Hole in the Ground" at Smithsonian.com/jukebox. K.R.F.

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THE OBJECT AT HAND | Crystal Cranium

NATIONAL MUSEUM OF NATURAL HISTORY

SKULLDUGGERY

An eerie (and cinematic) artifact, thought to be pre-Columbian, is not as old as some would have us believe **BY OWEN EDWARDS**

THE CRYSTAL SKULL sought by Harrison Ford as Indiana Jones in the latest silver-screen installment of the archaeologist's over-the-top adventures is, of course, a movie prop—masquerading as an ancient artifact from pre-Columbian Central America. (Disclosure: in my day job, I work for a magazine published by producer George Lucas' Educational Foundation.) As it happens, the prop bears a strong resemblance to scores of crystal skulls in museum collections around the world. These skulls, carved from large chunks of quartz, may well have been chiseled by descendants of Aztecs and Mayans, but they are decidedly *post*-Columbian.

Fakes are an all too real part of the museum world. "There are always artists capable of making and selling things that seem old," says anthropologist Jane MacLaren Walsh of the Smithsonian National Museum of Natural History (NMNH). Walsh has seen her share of fakes. In fact, she has become something of a specialist on the subject. "I didn't start out as a skeptic," she says, "but experience has changed my outlook."

In 1992, according to Walsh, the museum received an unsolicited donation of a larger-than-life, ten-inch-high skull carved from milky-hued quartz. Some time later, Walsh, an expert in Mexican archaeology, was asked to research the skull, one of several known to exist. Until that point, skulls of this kind typically had been attributed to ancient Mesoamerican cultures.

Walsh knew that if the skull proved to be a genuine pre-Columbian relic, it would constitute an important addition to the Smithsonian collection. But she harbored doubts from the start. "After Mexican independence," she says, "a lot of outsiders started coming into the country and collecting historic pieces for museums." The collectors, she adds, "created a demand, and local artisans then created a supply. Some of the things sold to these foreigners may not have been made to intentionally deceive, but certain dealers claimed that they were ancient."

A major player in the skull game, according to Walsh, was Frederick Arthur Mitchell-Hedges, an English stockbroker-turned-adventurer who, in 1943, began displaying a crystal carving that he called "The Skull of Doom" to his dinner-party guests. His daughter, Anna, later claimed that he had found the skull in a ruined temple in Belize during the early 1920s. The family's stories seemed to generate the "discovery" of more skulls with even wilder tales attached. (They had come from the lost city of Atlantis or been left by extraterrestrials.)

Investigations by the Linnean Society of London, a research institute specializing in taxonomy and natural history, revealed that Mitchell-Hedges actually purchased his skull at auction at Sotheby's in London in 1943 for around £400, about $18,000 today. How it came to the auction house isn't known. (Anna Mitchell-Hedges kept it until her death at age 100 last year; the object remains in the family.) Experts now believe that many extant crystal skulls were made in Germany during the late 1800s; Walsh thinks that the Smithsonian skull was carved in Mexico in the 1950s.

By 1996, Walsh had decided to put the skull to the test. She took it to London's British Museum, whose collections contain two similar skulls. Margaret Sax, a materials expert there, used scanning electron microscopy to study tool marks on the skulls. In each case, she noted that modern tools and abrasives had been employed. Today, the skull that launched Walsh's sleuthing sits in a locked cabinet in her Washington, D.C. office, faux and forlorn. Walsh, offering an explanation as to why many museums even today exhibit crystal skulls as authentic Mesoamerican antiquities, describes the artifacts as "reliable crowd pleasers."

A few years ago, another skull was sent to NMNH for testing. Researchers took a sample; what had appeared to be quartz crystal was found to be glass.

"So that [one]," says Walsh, "turned out to be a fake fake."

JAMES DI LORETO / NMNH (S)

OWEN EDWARDS, *who lives in San Francisco, is a freelance writer and author of the book* Elegant Solutions.

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What's Up

DRONE HOME

The U.S. military began building unmanned aircraft for combat and surveillance in 1918. Now, six drones are on permanent display at the Air and Space Museum, including the Boeing X-45A (above).

POSTMODERN POSTERS

Advertisements can become art, as shown by a whimsical 1918 poster of actor Charlie Chaplin (below). Learn more at "Ballyhoo! Posters as Portraiture" at the National Portrait Gallery through February 8.

ART WITH A FEELING

Charles Lang Freer, a Detroit industrialist and museum founder, loved the rich texture of paintings like the 1891 *Piano* (left) by Thomas Dewing. "Surface Beauty," now on long-term view at the Freer Gallery, showcases works from his collection.

OLD BALLGAME

"Separate and Unequaled" follows black baseball in the nation's capital, from the sandlot to the ballpark (right: the 1944 Homestead Grays). The Anacostia Museum's show is at the Historical Society of Washington D.C. until October 5.

THE MUPPETS TAKE D.C.

Jim Henson's puppets, from odd-couple roommates Bert and Ernie (right) to Kermit the Frog, populate a "Fantastic World," on display at the International Gallery from July 12 until October 5.

BY KENNETH R. FLETCHER

ERIC LONG / NASM, SI; FREER GALLERY, SI; NPG, SI; ART CARTER PAPERS, MOORLAND-SPINGARN RESEARCH CENTER, HOWARD UNIVERSITY / ANACOSTIA MUSEUM, SI; JOHN E. BARRETT, SESAME WORKSHOP / SITES

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For an insider's look at the Smithsonian, visit Smithsonian.com/mallblog

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Faith Ford

Faith Ford, Actress/Producer
Louisiana Native

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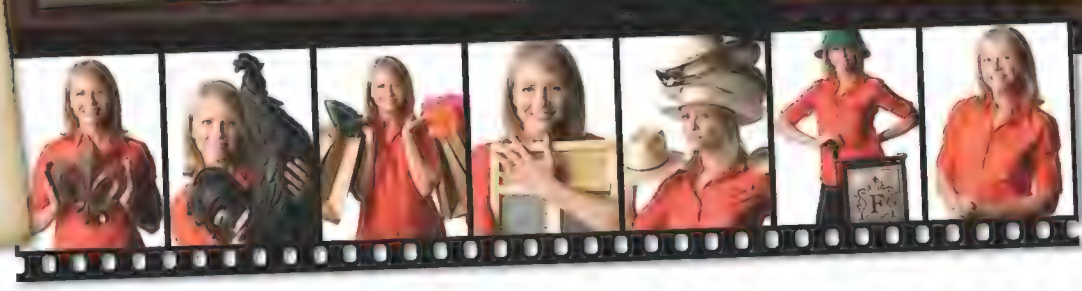

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Smithsonian
JULY 2008 VOLUME 39, NUMBER 4

Raiders

The *Sea Stallion* (2007 voyage) is "the best living-archaeology experiment ever conducted," says the director of the National Museum of Ireland.

or Traders?

A replica Viking vessel plying the North Sea this month is part of an effort to learn more about what the Norsemen were really up to

BY ANDREW CURRY PHOTOGRAPHS BY CARSTEN SNEJBJERG

From his bench toward the stern of the *Sea Stallion From Glendalough*, Erik Nielsen could see his crewmates' stricken faces peeping out of bright-red survival suits. A few feet behind him, the leather straps holding the ship's rudder to its side had snapped. The 98-foot vessel, a nearly $2.5 million replica of a thousand-year-old Viking ship, was rolling helplessly atop waves 15 feet high.

With the wind gusting past 50 miles an hour and the Irish Sea just inches from the gunwales, "I thought we'd be in the drink for sure," says Nielsen, 61, a retired geologist from Toronto.

It was August 6, 2007, and the *Sea Stallion*'s crew of 63 had been underway for five weeks, sailing from Denmark to Dublin on a voyage that would culminate 35 years' research—"the best living-archaeology experiment ever conducted anywhere," Pat Wallace, director of the National Museum of Ireland, calls it.

As Nielsen and some crewmates struggled to keep the *Sea Stallion* upright, four others went to work at the stern. Kneeling on the ship's heaving, rain-slicked deck, they hauled the 11-foot rudder out of the water, traded the broken leather straps for jury-rigged replacements made of nylon and reattached the new assembly.

Reducing the sail to a minimum, the crew sailed on at nine knots. As the ship plowed from wave to wave, a full third of the *Sea Stallion*'s hull was often out of the water. Ahead lay the Isle of Man, 15 hours away.

After a nine-month stay at the National Museum of Ireland, the *Sea Stallion* is being readied for a return trip to Denmark, scheduled to begin June 29.

In the meantime, researchers have been poring over reams of data from last summer's voyage, gathered from electronic sensors on the ship, to learn more about the Vikings' sailing prowess. Their findings will follow a host of discoveries in recent years by historians, archaeologists and even biologists that have led to a new understanding of the Vikings as a people who were as adept at trading as they were at raiding.

> Ragnar said he had not seen "lands so fertile and so rich, nor ever a people so cowardly."

Norsemen have been seen as intrepid seafarers and fierce warriors—a sort of Hell's Angels of the early Middle Ages—since A.D. 793, when they raided the rich island monastery at Lindisfarne off the northeastern coast of England. "The ravages of heathen men miserably destroyed God's church on Lindisfarne," according to the annals known as the *Anglo-Saxon Chronicle*. In 845, the Viking raider and extortionist extraordinary Ragnar Lothbrok slipped up the Seine with 120 ships—an estimated 5,000 men—to Paris, where King Charles the Bald paid him 7,000 pounds of gold and silver to leave in peace. (A contemporary wrote that "never had [Ragnar] seen, he said, lands so fertile and so rich, nor ever a people so cowardly.")

Viking raiders traveled thousands of miles to the east and south: across the Baltic, onto the rivers of modern-day Russia

PP. 24-25 CARSTEN SNEJBJERG / WPN

The Vikings "were people without boundaries," a researcher in Sweden says—adept at seafaring (above: the *Sea Stallion* in Denmark last year) and fearsome on land (left: Ragnar's siege of Paris, in a 19th-century engraving).

and across the Black Sea to menace Constantinople in 941. "Nobody imagines they were there to capture the city," says Cambridge University historian Simon Franklin. "It was more terroristic—all about instilling fear and extracting concessions for trade."

At the same time, recent research has suggested that the Vikings pouring out of Denmark, Sweden and Norway 1,200 years ago had more on their minds than raiding, though they were not above using their martial reputation to their advantage in areas where they were vastly outnumbered. These adventurers also wove a network of trade and exploration that stretched from Russia to Turkey to Canada, buying and selling goods from places as distant as China and Afghanistan. "They were people without boundaries," says Wladyslaw Duczko, an archaeologist at the University of Uppsala in Sweden. "I think that's why Vikings are so popular in America."

Recent climate research has led Duczko and others to suggest that a warming trend around the ninth century led

PP. 26-27 CARSTEN SNEJBJERG / WPN; RUE DES ARCHIVES / GRANGER COLLECTION, NEW YORK

The *Sea Stallion* was built with period tools and techniques (left: an oak felled for the hull). A winter in dry dock (above) followed its sail to Dublin.

to a population boom in Scandinavia, and that landless young Norsemen, crowded out at home, sought their fortunes elsewhere. Not everyone agrees. Wallace, at the National Museum of Ireland, says the Vikings may have had a simpler motive: "They had the best iron in the world, trees to cut down and build ships, the best swords and edges on their blades," he says. "All the factors were there. They could do it, and they did."

In any case, evidence of the range of the Vikings' trading networks began turning up about 150 years ago, when their elaborate burial mounds were first excavated by archaeologists. Well-preserved graves in Birka, Sweden, for example, contained fragments of Chinese silk, and in Norway, the ships in which wealthy Vikings were customarily buried bore paint whose blue pigment may have come from Indian indigo or Middle Eastern lapis lazuli.

In the 1970s, archaeologists in Dublin found a Viking settlement spread over several acres—and in it more than 3,000 pieces of amber that were probably imported from Denmark. Excavation at Staraya Ladoga, outside St. Petersburg, has unearthed a multiethnic settlement that includes Viking jewelry, weapons and tools buried amid 1,000-year-old houses. Elsewhere in Russia, archaeologists have uncovered more than 400 complexes with Scandinavian graves and artifacts from the Viking era; as recently as 2006, they found one in the province of Kaliningrad, 500 miles from Norway.

Almost all the sites share a common artifact: thin, silver coins called dirhams. These were usually produced in Baghdad, which was the center of the Arab world from 750 to 950, and the coins were often stamped with the year they were minted. Vikings, it seems, traded such goods as furs, amber, ivory and slaves for dirhams, which they then brought back on their ships. The coins mark Viking trade routes like shiny silver bread crumbs.

In January 2007, metal-detector hobbyists in Harrogate, England, uncovered a treasure worth millions of dollars that a Viking or Vikings buried around 927; it included 617 coins, 15 of which were dirhams. Thousands of dirhams dating from 780 to 1050 have been found at several Viking sites near St. Petersburg. In Poland, archaeologists excavating at a Viking settlement near Gdansk found nearly 800 coins dating from 780 to 840, almost all of them Arabic. Still other Arabic coins made their way to France, Ireland, Iceland and Greenland. "What we're seeing is the remnants of an extremely intricate network of barter trade," says Cambridge University historian Jonathan Shepard. "It's a weird combination of coercion and tribute side by side and intermingled with bartering. That sort of weird mix is essential to Viking dominance of this huge area."

To illustrate the extent of Vikings' travel, Shepard cites the example of King Olaf II's youngest half brother, Harald

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ANDREW CURRY *wrote about Japanese hot springs for the magazine's March issue.* **CARSTEN SNEJBJERG** *is a freelance photographer based in Copenhagen.*

Watch a video of the 2007 voyage at Smithsonian.com/viking

CRISPIN RODWELL / PA PHOTOS; WERNER KARRASCH / VIKING SHIP MUSEUM, DENMARK

Hardrada, whose birth in Norway in 1015 is marked in Icelandic sagas. At 20, Harald sailed east to Constantinople (present-day Istanbul), where he turns up in Byzantine histories as an imperial bodyguard. By 1045, when he returned to Norway to assume the throne, he was a veteran of battles in Bulgaria, Sicily, Syria and North Africa. At the time of his death in 1066 in England, he was trying to claim the island as part of Norway. "Harald's career was a blown-up version of the experience of a lot of individual Scandinavians," Shepard says.

A 2006 find in Sweden included dirhams.

Arabic coins called dirhams mark Viking trade routes like shiny silver bread crumbs.

As time passed, however, not all Scandinavians made it home. After a few generations of fighting with local rulers, by the 11th century some Vikings began adopting the languages and customs of local peoples, even settling in with them in places ranging from Ireland to Russia. Researchers at the universities of Leicester and Nottingham, in England, have recently found that up to half of the DNA from men in northwest England matches Scandinavian genetic types.

All that wandering would have been impossible without ships—which is where Erik Nielsen and the rest of the *Sea Stallion*'s crew come in. For most of the 20th century, archaeologists assumed that all Viking ships resembled a vessel excavated in Norway in 1880. Known as the Gokstad ship, for the farm on which it was found, it dated to the year 900. The ship was "clinker-built," meaning that it was constructed of overlapping planks, which made it stout, flexible and light, with a sail and room for 32 oarsmen. "Gokstad was thought to be universal, whether trader or raider," says Niels Lund, a Viking historian at the University of Copenhagen. After a replica was built, researchers discovered it could indeed cross the Atlantic—Magnus Andersen sailed it from Norway to Chicago for the 1893 World's Fair. But a discovery in 1962 forced researchers to abandon the idea that the Vikings had only one kind of ship.

At the bottom of a fjord near the Danish town of Roskilde, archaeologists found remnants of five Viking ships piled one atop the other. Dubbed the Skuldelev ships, for a nearby town, each had had a specialized role. One had been a fishing boat; two were cargo ships, so easy to handle that a crew of eight or nine could move 20-ton loads; and one was a warship that could carry about 30 people. The fifth ship, a raider known as Skuldelev 2, was the biggest.

It was 98 feet long but just 12 feet wide. Its keel reached just three feet below the surface, and its masts and sail could be lowered so the ship could approach fortifications and settlements with stealth. It could accommodate 65 armed men. "This is a boat for warriors," says Soren Nielsen, head boat builder at the Viking Ship Museum in Roskilde.

Because only 20 percent of the Skuldelev 2 could be recovered, the only way to determine its capabilities for certain was to somehow resurrect it and put it to sea. In 2000, Nielsen and his colleagues at the ship museum began working with scientists to build an accurate replica. They used thousand-year-old methods and replicas of tools from that time, which meant carving each of the ship's 90 oak planks with axes, wedges and hammers. After four years and almost $2.5 million, the eight builders had their replica. They called it *Sea Stallion From Glendalough* for the Irish village where Vikings used to find oak for their ships. With its narrow beam and shallow draft, the *Sea Stallion* could have navigated just about any river in Europe. But how would it fare on the open sea?

In the summer of 2006, the *Sea Stallion* sailed under sunny skies and gentle winds to Norway and back in four weeks—a virtual pleasure cruise. A test sail in May 2007 around the Roskilde fjord enjoyed similar conditions. "We like to say we've been cursed with good weather," says Carsten Hvid, the *Sea Stallion*'s skipper. A tougher, six-week test was planned for July 2007, with the crew sailing from Roskilde north to Norway, west to Scotland and south to Dublin. Fully loaded, the ship weighed 24 tons—eight of ship, eight of rock for ballast and eight of crew and gear. In ideal conditions, the *Sea Stallion* could travel 160 nautical miles in a day; it could sprint at 13 knots, or almost 15 miles an hour. (A high-tech America's Cup racer might hit 20 knots.) "It ranks as one of the fastest warships in history," says Anton Englert, an archaeologist at the ship museum.

The ship set sail for Dublin on July 1 under dark skies that presaged Northern Europe's coldest and wettest summer in decades. Nighttime temperatures plunged into the 30s. Three days into the voyage, two crew members had been treated for hypothermia; weak

TOBIAS WALLSTROM / AFP / GETTY IMAGES; MAP: RODICA PRATO

winds forced Hvid to take a 24-hour tow across part of the North Sea to stay on schedule. "It kept on raining and raining and raining," says crew member Henrik Kastoft, a spokesman for a Danish political party in his day job. "There were so many nights I just sat there shivering for hours." Each member of the crew had only about eight square feet of space to himself. "I really suffered from being so close to people for so long. I got edgy, cranky," says Erik Nielsen. "Maybe the modern analogue would be a submarine."

If the night the rudder broke was the low point of the voyage, sailing along the western coast of Scotland almost made up for it. For nearly two weeks, the crew had the dramatic scenery almost completely to themselves. But crowds grew as the ship neared Dublin. When it cruised up the River Liffey and into port on August 14, ships and cars blasted their horns, church bells pealed and throngs of people waved from the balconies and windows of riverfront buildings.

Days later, the ship was trucked to the center of Dublin and lifted by a crane over a four-story building into the courtyard of the National Museum of Ireland, where it would spend the winter. By then archaeologists at the ship museum in Roskilde had begun analyzing data generated during the voyage. As the crew's close call in the Irish Sea made clear, high speeds over long distances pushed the ship to its limits—and challenged some assumptions about how the original had been put together. "The sails are very stable and can take a lot of wind, but the problems with the rudder come up again and again, and haven't been solved yet," Englert says.

"One of the fastest warships in history": the *Sea Stallion* was under full sail rounding Scotland (above), but approaching Dublin, crew members had to row against the wind (left).

The skies presaged Northern Europe's coldest and wettest summer in decades.

Information from the crew proved as valuable as technical data. Exhausted sailors told researchers that the close quarters made sleeping nearly impossible. Between the rough water, constant rain and their nautical duties, it was all crew members could do to nap for an hour or two during their rest periods. "That indicates the ship must have had an amphibious behavior—they had to land often just to get some rest," Englert says. Crossing the North Sea in a narrow ship like this one would have stretched a Viking crew almost to the breaking point, and crossing the Atlantic would have been inconceivable. A ship like this would have been used for coastal raiding.

On June 29, the *Sea Stallion* will put to sea once again, taking a possibly more challenging—and perhaps more revelatory—course: down the Liffey, out of Dublin harbor, south and then east around England to the cliffs of Dover. Then across the North Sea, following its Viking predecessors northeast toward home.

WERNER KARRASCH / VIKING SHIP MUSEUM, DENMARK; CARSTEN SNEJBJERG / WPN

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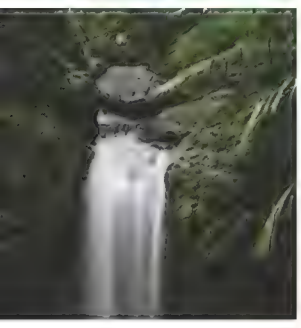

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PRECARIOUS LEBANON

STRICKEN BY SECTARIAN WARFARE AND STILL REELING FROM THE 2005 MURDER OF ITS FORMER PRIME MINISTER, THE MEDITERRANEAN NATION BROKERS A FRAGILE PEACE

BY JOSHUA HAMMER

RAMZI GHOSN TAKES A BITE of a bruschetta and a sip of red wine and gazes through the windows of his Provençal-style restaurant at the wintry vineyards and snow-blanketed mountains in the distance. Diners at rustic oak tables are sampling the winery's Sunday menu—lentil salad, fondue, quail, apple tarts and arak, a powerful anise-flavored liqueur. In the center of the room a trio of chefs slide baby lamb chops into a brick oven; a Chopin piano sonata plays softly in the background. "I started preparing meals for a few friends, and then it just grew," Ghosn says with more than a touch of pride.

It could be Tuscany. But this is the Bekaa Valley, a fertile, sun-drenched plateau wedged between 8,000-foot peaks in central Lebanon, one of the most volatile countries in the world. An hour to the west is Beirut, the seaside capital, where long-standing sectarian tensions flared up in May, killing at least 65 people—only weeks after I met with Ghosn. Across the valley lies Syria, whose troops occupied the country for 29 years and whose dictatorship, run by Bashar al-Assad, continues to wield a malign influence over Lebanon's affairs. The Bekaa itself is a no man's land, partly controlled by Hezbollah, the Shiite Muslim force supported by Syria and Iran (and which the U.S. State Department considers a terrorist organization), and partly by outlaw farmers who

PHOTOGRAPHS BY KATE BROOKS

As sectarian tensions flared this past May, hostilities escalated (Beirut, from an apartment damaged by Hezbollah shelling). The renewal of violence dashed hopes that Lebanon could soon become—once again—"a freewheeling place where everybody could live his own life."

export more than 100 tons of hashish to Europe each year—and who defend their territory with heavily armed militias.

A Maronite Christian from east Beirut, Ghosn, 40, and his brother Sami opened the Massaya Winery in 1998, at a time when Lebanon seemed on the rebound after a devastating civil war. French investors provided most of the capital, and the Ghosn brothers built up production to 300,000 bottles a year. ("Of the Lebanon wineries, Massaya is the hippest," the *New York Times* declared in 2005.) Islamic fundamentalists in the area have never bothered him: "Wine has been part of the culture here since the Phoenicians 4,000 years ago," Ghosn says, lighting up a Toscana cigar.

But Lebanon's stability was short-lived. When war broke out between Israel and Hezbollah in July 2006, missiles struck guerrilla training camps up the road, damaging the vineyard's buildings and sending Ghosn's grape harvesters fleeing. Now, with the country facing an uncertain future, Ghosn isn't taking chances. In his wine cellar, hundreds of crates of chardonnays, syrahs and sauvignon blancs are stacked for transport to Beirut. "We're sending as much abroad as we can now," he tells me, "because we don't know what's going to happen next."

It is a common lament in Lebanon. For decades, this tiny Mediterranean nation of four million—carved by the French from the Ottoman Empire after World War I—has segued between two identities. There's the alluring, sensual Lebanon, renowned for its fine wines, culinary sophistication, Roman ruins and sybaritic beach scene. Generations of Arabs have flocked to Beirut to soak up the Rive Gauche atmosphere, stroll the seaside Corniche and revel in the city's cosmopolitanism and defiant secularism. Then there is the Lebanon riven by rivalries among its main sects—Maronite Christians, Sunni Muslims and Shiite Muslims—exploited by stronger neighbors and seized periodically by armed conflict.

ISLAMIC FUNDAMENTALISTS IN THE AREA HAVE NEVER BOTHERED HIM: "WINE HAS BEEN PART OF THE CULTURE HERE SINCE THE PHOENICIANS 4,000 YEARS AGO."

In 1975, a running feud between Christians and Yasser Arafat's Lebanon-based Palestinian guerrillas spiraled into war. In central Beirut, Christians and Muslims fought pitched battles. In 1976, Syria dispatched troops, first joining Christians in the fight against Palestinians, then battling alongside Muslims against Christians. According to *New York Times* columnist Thomas L. Friedman in his classic account *From Beirut to Jerusalem*, more than 40 militias were fighting in Lebanon during the early 1980s. By the time the exhausted foes signed the Taif agreement in 1989, most of the country lay in ruins, tens of thousands were dead and Lebanon was largely under foreign occupation. Israel, which had invaded in 1982, held on to a southern buffer zone to prevent attacks on northern Israeli towns. Syria kept tens of thousands of troops in Lebanon, maintaining a stranglehold over political and economic life.

Then, in the late 1990s, Lebanon began a remarkable turnaround, guided by its charismatic prime minister, Rafik Hariri. A Sunni Muslim who had made billions in construction in Saudi Arabia, Hariri "had a vision of Lebanon as Hong Kong, a freewheeling, easygoing place where everybody could live his own life," says Timur Goksel, a former spokesman for the United Nations peacekeeping force in the south who has lived here for 28 years. Hariri restored much of Beirut, cultivated political adversaries and began luring back investors. When I first visited Lebanon in 2001, the economy was booming, beach clubs were filled with

Ramzi Ghosn (at his Bekaa Valley vineyard and restaurant) has stepped up wine exports. "We're sending as much abroad as we can," he says, "because we don't know what is going to happen."

tanned jet skiers and the opulent lobby of the Phoenicia Hotel was jammed with wealthy Gulf sheiks on holiday.

Hariri was assassinated three years ago by a car-bomb explosion near Beirut's Corniche, allegedly carried out by Syrian agents unhappy with his bold assertions of Lebanon's independence. Lebanon's darker identity took hold —with car bombs, political chaos and a 34-day war between Hezbollah and Israel in 2006 that left at least 1,000 dead and billions of dollars in damage. Today Lebanon seems trapped between an economically vibrant, tourist-friendly democracy and Islamic radicalism and Arab-world intrigue. The population is split, grappling over whose voice will define the country: Sheik Hassan Nasrallah, the fiery, Israel-hating leader of Hezbollah, or Saad Hariri, son of the murdered ex-prime minister, a political novice who talks of reviving Lebanon's economy and bringing his father's killers to justice. (This past May, Lebanon's Parliament elected a compromise candidate, army commander Gen. Michel Suleiman, as president, ending six months of deadlock.)

A more democratic, moderate Lebanon, experts say, could provide a foothold for reform throughout the Middle East. A weak, chaotic Lebanon, however, means a haven for radical Islamists, a resurgent Hezbollah and an opportunity for Iran and Syria, America's principal adversaries, to make more mischief in a volatile region. The fighting that took place in May, when Hezbollah guerrillas overwhelmed Sunni and Druse forces and occupied west Beirut for three days, demonstrated that power rests with Shiite extremists. The geopolitical stakes are enor-

mous, according to Paul Salem, the Lebanese political scientist who directs the Carnegie Middle East Center, a Beirut-based think tank. "You've got a standoff, with the United States and Saudi Arabia in one corner and Syria and Iran in the other." The outcome could shape the future of the Middle East.

Lebanon's location vis-à-vis Israel and Syria has virtually ensured conflict.

WHEN I VISITED Beirut this past March, the city seemed to have changed little since my last trip six years earlier, at the height of an economic boom. Joggers and in-line skaters still made their way along the Corniche, the promenade that hugs the coast, offering views of the snowy Mount Lebanon range—where Beirutis escape on ski getaways in the cooler months. At lunchtime on my first day in town, I met Timur Goksel at his favorite outdoor café, Rawda, a venerable institution that remained open through the civil war. The Turkish-born former U.N. staffer was holding court over a cup of Arabic coffee and a narghile, the water pipe popular throughout the Middle East. From this seaside perch, with blue water lapping at the shore and families eating mezze—a traditional platter of hummus, tabbouleh and other Lebanese specialties—it was easy to conjure up the Beirut of better times. Goksel gestured toward the apartment blocks lining the seafront, packed with condominiums that still fetch prices in the $4 million range. "They are sold to people from the Gulf who are looking for an escape," he told me. "They know they're getting ripped off, but they're getting ripped off in Arabic with a smile, instead of being ripped off in Europe and being looked down on."

Beneath the still-alluring facade, however, Beirut was a mess: the government was barely functioning; the Hezbollah-led opposition was boycotting Parliament; downtown was nearly deserted. Many parliamentary representatives were hunkered down at home or in fancy hotels in fear of assassination, and the Executive Mansion had been sitting empty for four months because Parliament couldn't convene to select a president. The political standoff would come to a head two months later, when the Sunni-led government banned a private fiber-optic communications network that Hezbollah operated and also fired the Hezbollah-backed airport security chief, claiming that he was acting as an agent of Syria and Iran. Hezbollah's Nasrallah called the moves a "declaration of war." His fighters took to the streets, overrunning Sunni militias loyal to Saad Hariri. Fighting spread throughout the country; by the time the government backed down and Hezbollah withdrew, dozens had died. Now a fragile truce is in place, protected by the relatively weak Lebanese Army.

"Lebanon is a failing state," Goksel said, between narghile puffs. With the administration effectively paralyzed, most Beirutis had fallen back on a kind of traditional feudalism, taking their problems to powerful local families. "In Hariri's time, these [feudal] families lowered their profile," Goksel told me. "But in the absence of the state, in the vacuum, we went back to our good old ways. The country is really running by itself."

That afternoon I went to see Bernard Khoury, Lebanon's internationally renowned architect, who works out of loft space in Beirut's Quarantine—a run-down neighborhood near the port. Khoury's studio could have been in Manhattan's Tribeca, were it not for sweeping views of the Hezbollah-dominated southern suburbs from his floor-to-ceiling windows. An austere figure who dresses exclusively in black, Khoury has designed buildings from Berlin to New York City. But it is Beirut,

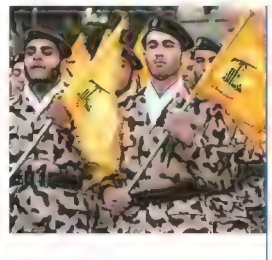
TIMES OF TROUBLE

A series of flash points defines a nation's recent history

1975
Civil war erupts after Christian militants attack a bus of Palestinians in Beirut, igniting sectarian tensions and paving the way for Syrians to occupy Lebanon.

1978
After an attack by Lebanon-based Palestinians, Israeli troops invade, occupying the south until 2000.

1983
In West Beirut, Shiite militants bomb Marine barracks, killing 241 U.S. and 56 French troops.



1991
Most militias disarm under the Taif agreement, ending the civil war, but Hezbollah stays armed as a "resistance force" against Israel.

1992
Financier Rafik Hariri becomes prime minister, ushering in a period of stability.

2005
Hariri is killed in a car bombing in February, catalyzing anti-Syrian protests. Two months later, Syria withdraws its troops.

2006
Hezbollah abducts two soldiers in Israel, leading to a 34-day incursion.

MAY 2008
Hezbollah briefly overtakes much of Beirut, breaking a promise to use its weapons only against Israel.

1970 1980 1990 2000 2008

MAP: GUILBERT GATES; TIMELINE IMAGES (CHRONOLOGICAL): YAHYA YAMANI / AP IMAGES; USMC / AP IMAGES; HUSSEIN MALLA / AP IMAGES; AP IMAGES; KATE BROOKS

he says, that remains the source of his inspiration. His output here has been prodigious: sushi bars, nightclubs, office buildings and apartment blocks. The city, Khoury told me, has always been a place of contradictory realities compressed into a tiny space, but the juxtapositions had taken on a surreal cast in the past three years. "At the end of the 2006 war, I could sit here watching the fireworks at night over the southern suburbs," he recalls. "It was seven minutes away by taxi, and it was a radically different world."

This bizarre collision of realities is perhaps most visible in the "martyr" billboards and other memorials that seem to rise on every corner of the city. When I arrived, the highway from Beirut's international airport—Hezbollah territory—was lined with yellow placards of Imad Mugniyah, the just-assassinated (in Damascus) chief of Hezbollah's military wing. Mugniyah allegedly had engineered the bombing of the Marine barracks in Beirut in 1983, where 241 Americans were killed. A ten-minute drive away, in the heart of the downtown area that Hariri had rebuilt, the martyred pro-Western leader's image was everywhere: on giant posters on the sides of buildings, on billboards and on dozens of hagiographic photographs looming inside the huge mosque where his body lies entombed. (Hezbollah would overrun this neighborhood two months after my visit.) On the very spot where Hariri died, a metal sculpture erupts in symbolic flame every afternoon at five minutes past one—the moment when the car bomb detonated.

Post-World War II Beirut (above: in 1956) was a haven for vacationers. Lebanese author Maha Samara has likened the city of that era to "a beautiful woman promising love and light of the sun."

"Losing Hariri was a massive blow," Paul Salem told me. "He could have stitched together a stronger Lebanese coalition than anyone else. He was a master dealmaker, and when he died, the chances for reconciliation fell apart." We were sitting in Salem's office just off Martyrs Square, where a million-strong crowd had assembled a month after Hariri's assassination to demand Syria's military withdrawal. The demonstrations, along with mounting international pressure, forced Syria's dictator, Bashar Assad, to remove his 14,000 troops that May. This so-called Cedar Revolution also spawned a pro-Western governing coalition in Lebanon known as the March 14 movement. The Assad regime, however, is widely believed to be working to neutralize the March 14 movement and regain its footing in the country: since Hariri's death, car bombings in and around Beirut have claimed the life of a young investigator looking into the murder, as well as those of a dozen journalists and politicians opposed to Syrian dominance. Not one of the killings has been solved. Salem, for one, has little doubt that high-ranking Syrian officials are behind the terror. "Syria is a very scared regime," Salem told me. "If you live in Damascus, you see the Lebanese mountains to the west, and if you don't control them, you imagine the CIA peering down on you. With the United States in Iraq, and the Golan Heights in

"LOSING [RAFIK] HARIRI WAS A MASSIVE BLOW. HE WAS A MASTER DEALMAKER, AND WHEN HE DIED, THE CHANCES FOR RECONCILIATION FELL APART."

Writer **JOSHUA HAMMER** *is based in Berlin. Photographer* **KATE BROOKS** *has lived in Beirut for three years.*

INGE MORATH © THE INGE MORATH FOUNDATION / MAGNUM PHOTOS

In 2005, TV journalist May Chidiac (at home in Beirut in January 2007), a critic of both Hezbollah and Syria, was injured in a car bombing. The perpetrators, she says, "wanted me to burn."

Israel's hands, it all adds up to paranoia."

I drove into the hills of the Christian eastern half of Beirut to meet May Chidiac, a talk-show host and former anchorwoman for a Maronite-run television station. For years, Chidiac had used her TV pulpit to lash out at Syria and Hezbollah and to agitate for withdrawal of the Syrian troops. After Hariri's death, her criticism grew more vociferous. On September 25, 2005, as Chidiac stepped into her Range Rover, after a Sunday morning visit to a monastery near Mount Lebanon, explosives attached underneath her vehicle detonated.

> "I STARTED SEEING SOMETHING LIKE BLACK SNOW FALLING ALL OVER MY HEAD . . . . I HEARD A VOICE CALLING 'WAKE UP, MY GIRL'; MAYBE IT WAS MY LATE FATHER SPEAKING TO ME FROM THE SKY."

"At first I just wondered: What is happening?" she told me, as we sat in the living room of her guarded hillside condominium. "I started seeing something like black snow falling all over my head. I lost consciousness. I heard a voice calling 'Wake up, my girl'; maybe it was my late father speaking to me from the sky. Then I found myself lying on the back seat, trying to pull myself out of the car, because I was afraid that a fire would start and I would burn alive."

Chidiac, 44, lost her left arm and left leg in the explosion. Hundreds of pieces of shrapnel penetrated her body; she suffered third-degree burns over her torso and remaining arm. (She says the bombers had laced the dynamite with C-4 flammable explosive, because "they wanted me to burn.") She spent ten months undergoing physical therapy in a hospital in Paris, learning to walk with a prosthesis—arriving back in Lebanon the day before the Israeli-Hezbollah war began. Chidiac moves around her apartment in a motorized wheelchair, using the artificial leg only when she ventures outside. She says that it would have been easier to accept her injuries if the "sacrifice" had helped to bring about "the Lebanon that I believe in. But it's no closer to coming true. Maybe it's better for everyone to have his own piece of land and rule it the way he wants," she says. "Then [Hezbollah's] Nasrallah can continue his war against Israel on his own land, and Israel will respond on his land, not on mine."

EARLY ON A SATURDAY MORNING, I headed east out of Beirut to visit one of the country's most powerful feudal leaders: Walid Jumblatt, the chieftain of the Druse, adherents of a secretive religious sect related to Islam and found primarily in Lebanon, Israel and Syria. Jumblatt was to play a critical role in the events leading to the fighting in May: the Druse leader alleged that Hezbollah had set up cameras near Beirut international airport to monitor the movement of anti-Syrian politicians—and possibly to plan their assassinations. As a result, the government demanded the ouster of the Hezbollah-backed airport security chief, Brig. Gen. Wafik Shoukair, one of the moves that touched off the explosion of violence. I drove up a winding road that led high into the snow-dappled Shouf Mountains, passing ancient, stone-walled Christian and Druse villages still scarred by fighting from Lebanon's

civil war. Hundreds of Druse men, many wearing traditional white skullcaps, were gathered around the gated entrance of Jumblatt's ancestral palace, while Kalashnikov-toting guards checked every visitor. I found Jumblatt, a scarecrow-like figure with a wild fringe of graying hair and world-weary demeanor, in the crowded drawing room of his 300-year-old palace, a turreted sandstone chateau. He was seated in an armchair, patiently listening to constituents' concerns—legal problems, marital woes, access to civil service jobs. "I can't please them all, but I do my best," he told me with a shrug, during a break between one-on-one sessions.

JUMBLATT'S LIFE STORY reflects the byzantine and bloody politics of the region. When war broke out in 1975, his father, Kamal, was a Socialist politician allied with the Palestinians and their Lebanese Muslim partners against the Maronite Christians. Kamal Jumblatt begged then-Syrian president Hafez al-Assad to keep Syrian troops out, but in 1976 Syria moved in, initially backing the Maronites. Kamal continued to criticize Assad; the next year he was shot dead in an ambush on a mountain road, allegedly by Syrian agents. Twenty-seven-year-old Walid, then something of a playboy, found himself in charge of the Druse. (Walid keeps his father's bullet-riddled identification card on display in his office.)

Despite the killing of his father, Jumblatt stayed loyal to Syria for the next two decades—it was a question of "survival," he says—while he remained in Lebanon to protect the small Druse community against sporadic violence. But in 2003, following the U.S. invasion of Iraq and the cooling of U.S. relations with Syria, Jumblatt felt sufficiently emboldened to call for an end to Syrian occupation—and publicly accused Syria of murdering his father. That defiant act put him high on a Syrian death list, according to Lebanese intelligence officials, and forced him to beef up his protection and curtail his movements. After the Hariri assassination, he became even more cautious. "They could be waiting for me at any checkpoint in Beirut," he told me. "They are able to fix up a car bomb anywhere, anytime."

Jumblatt led me through the palace's labyrinthine corridors, across a garden to the private wing of his house. His office, where a loaded Glock pistol was in plain view, was filled with souvenirs: Soviet flags from his days as a supplicant to the Communists in Moscow; photographs of him with President Bush and Secretary of State Condoleezza Rice during a 2006 visit to Washington to enlist support for the March 14 movement. We stepped into the garden and gazed across a gorge toward the domain of his nemesis, Syrian president Bashar Assad. Jumblatt told me that he had met the Syrian leader several times, most recently in 2003, when Hariri brokered a reconciliation attempt that went nowhere. "At the beginning, Assad convinced people that he was in favor of reforms in Syria," Jumblatt told me. "He spoke English fluently, he fooled a lot of people. But [he had] the same archaic, brutal approach as his father." I asked if Jumblatt had any regrets about turning away from his former protectors after 29 years. He shook his head. "Now my conscience is clear, finally, and that is good. I think my father would be approving." Jumblatt has pushed for the U. N. to investigate Syria's role in the Hariri murder. "It's not easy. It's going to be very long road, until we get rid of Bashar, until we get rid of Nasrallah, until we bury them like they buried us."

TWO DAYS LATER, I'm catching my breath atop the Beaufort Castle in southern Lebanon, a Crusades-era ruin perched on a 2,000-foot cliff just north of the Litani River. The deep gorges of the Shiite-dominated south extend toward the red-tile-rooftops of Metulla, an Israeli border town just eight miles away. Israel used this medieval fortress as a battalion headquarters during its 18-year occupation; it overran much of the area again when it invaded in July 2006. The flags of Hezbollah and Amal (the Lebanese Shiite political party) flutter from the top of the cliff face, which was scaled 167 times by Hezbollah guerrillas during the first occupation; the fighters killed 19 Israeli

Druse leader Walid Jumblatt (at his ancestral home in the Shouf Mountains) acknowledges that Syrian agents might kill him at any time. "They could be waiting for me," he says, "at any checkpoint in Beirut."

Ahmed Matloum (kneeling) and his two brothers visit a Bekaa Valley cemetery where 12 cousins—all Hezbollah fighters—are buried. Matloum sees renewed conflict as likely: "We are ready to fight."

troops during those assaults. Today, Israeli fighter jets scream overhead in the direction of Beirut on near-daily demonstrations of military might.

If Hezbollah and Israel go to war again, Muslim towns and villages lying south of Beaufort will undoubtedly bear the brunt of the assault in Lebanon, as they did during Israel's 34-day incursion in 2006. (The war was touched off after Hezbollah seized two Israeli soldiers and killed eight others near a disputed border zone.) Despite Nasrallah's bluster, most observers don't think that another war is imminent: the people of the south are exhausted, still trying to rebuild their bombed-out infrastructure two years later. An 18,000-man U.N. peacekeeping force patrols a buffer zone between the Litani River and Israeli border, restricting Hezbollah's movements and making smuggling of weaponry into the area difficult. "I can never see Hezbollah initiating anything. It would be suicidal," Goksel had told me earlier, in Beirut. "Israel can't live with those rockets raining on their territory. Hezbollah knows that the next time, the Israelis will turn south Lebanon into a parking lot."

But as I tour Hezbollah strongholds in the south and in the Bekaa Valley, I get the sense that few Lebanese consider the confrontation between Hezbollah and Israel resolved. "I hope there is another war," says Ahmed Matloum, a 26-year-old Shiite in the Bekaa village of Vritel, targeted by Israeli

For an extended timeline, go to Smithsonian.com/Lebanon

bombers four times during the 2006 conflict because nearby foothills are rife with Hezbollah training camps. Standing with two younger brothers in a "Martyrs Cemetery" on the outskirts of town, Matloum points out the marble slabs beneath which 12 cousins, all Hezbollah fighters, lie buried, killed during the 1982-2000 Israeli occupation. Beyond them are five granite tombs, the graves of a family blown to pieces by an errant Israeli missile two years ago. "What do you think?" he asks me. "Is there going to be another war?"

"I hope not," I say.

"Inshallah [God willing]," he replies. "But we are ready to fight."

In fact, these days, the more likely threat of full-scale war comes from another quarter: in mounting tensions between Hezbollah and the many factions that make up the current Lebanese government, including Sunnis, Druse and some Christians. Hezbollah loyalists aren't the only Lebanese who relish the prospect of further fighting. Not far from Ramzi Ghosn's vineyard, I visited another entrepreneur who makes his living from the soil. Nuah Zayitir is one of Lebanon's biggest cannabis cultivators, grossing, he told me, about $5 million a year. A pony-tailed 36-year-old, he lives with his wife and three children in a half-finished villa at the end of a remote dirt road, guarded by security men armed with automatic weapons and rocket-propelled grenade launchers. Zayitir said he had just had his most profitable year ever. In early 2007, Sunni militants affiliated with Al Qaeda gained control of a Palestinian refugee camp near Tripoli; after months of laying siege, the Lebanese Army wiped out hundreds of fighters and leveled the camp. With the Lebanese Army distracted by the Sunni extremists and the government in Beirut paralyzed, cannabis growers had been left to cultivate their crops in peace. "We hope there is never any government in Lebanon," he told me. "As long as there is war and chaos, it's great for people like me."

"ISRAEL CAN'T LIVE WITH THOSE ROCKETS RAINING ON THEIR TERRITORY. HEZBOLLAH KNOWS THAT THE NEXT TIME, THE ISRAELIS WILL TURN SOUTH LEBANON INTO A PARKING LOT."

For the moment, it's hard to predict what kind of Lebanon may prevail. Will it be a Hezbollah-dominated state planted squarely in the Syria-Iran camp, a pro-Western democracy or the every-man-for-himself free-for-all that Zayitir finds so lucrative? The Carnegie Middle East Center's Salem believes that Lebanon will likely emerge as a new kind of Middle Eastern entity, "a country with both a strong American presence and a strong Iran presence—like Iraq," he says. "It will be less black and white, more nuanced, more Middle Eastern."

On May 25, after Lebanon's warring factions had met in Qatar to seek a compromise that would quell the violence, the stalemate ended with the election of Michel Suleiman, a Maronite, as president. In these negotiations, Hezbollah emerged with a major victory: it achieved parliamentary veto authority. If this complex power-sharing agreement works, says Salem, "Things will stumble along toward calm." But, of course, Lebanon remains one of the world's most fractious countries and similar deals have collapsed before.

Back at the Massaya Winery, Ramzi Ghosn takes another sip of arak and marvels at Lebanon's ability to embrace the good life during the darkest of days. "Even if you're a Sunni or a Shia in Lebanon, you always knew that your neighbor might be a Christian and would be consuming wine," he says. "We're not so good at producing airplanes or tanks, but in terms of food and drink, we surpass everyone in the world."

WELCOME TO YOUR

This year's photo contest winners reflect decidedly international

A STRONG CURRENT swept in a bounty of jellyfish that September day, along with an irresistible opportunity for Thomas Vignaud, who was free-diving with underwater camera gear in the Mediterranean off the South of France. The 22-year-old marine biology student positioned his strobe light near one yellow jelly so that it seemed to glow, and held his breath to compose the (breathtaking) shot that won the Natural World category of our 5th Annual Photo Contest (p. 44).

This year we received nearly 7,000 entries in five divisions: The Natural World, People, Travel, Americana and Altered Images (for manipulated photography). Amateur photographers from 50 states and 82 countries submitted work, and our winners are from all over.

Three are from India (including Abhijit Dey, whose portrait, opposite, of a newborn in a West Bengal village won the grand prize—a Smithsonian Journeys trip for two); Vignaud is French. Even Hal Schneider, a Californian who won the People category, shot his winning photograph in Burkina Faso.

Lance Wills, an American who took the prize for Americana, travels the world as a deckhand aboard oceanic research vessels. Unable to sleep during a stay in the nation's capital, Wills photographed the Washington Monument just before midnight. Even at that late hour tourists were snapping photos by the monument's floodlights. Did they see what he saw in this familiar subject? Almost certainly not, judging by the similarity of submissions we receive of the iconic obelisk year after year.

A gallery of winners follows, and more finalist images are available at Smithsonian.com. "Eyes on the World: Smithsonian Magazine Photo Contest," an exhibition of the images, will be on display at the Smithsonian Castle from July 1 through January 15, 2009.

GRAND PRIZE WINNER, PEOPLE ▶
ABHIJIT DEY, AGE 35 • BARRACKPORE, INDIA
PHOTOGRAPHED AUGUST 2007

Six days after Betka Tudu's birth, female relatives and neighbors in the West Bengal village of Purulia gathered to bless him and "to protect him from harm's way," says Dey. Born into the Santhal tribe, Betka "unknowingly drew his distant kin closer than ever."

WORLD

points of view

BY ABIGAIL TUCKER

WINNER, PEOPLE
HAL SCHNEIDER, AGE 75
SAN DIEGO, CALIFORNIA
PHOTOGRAPHED NOVEMBER 2006

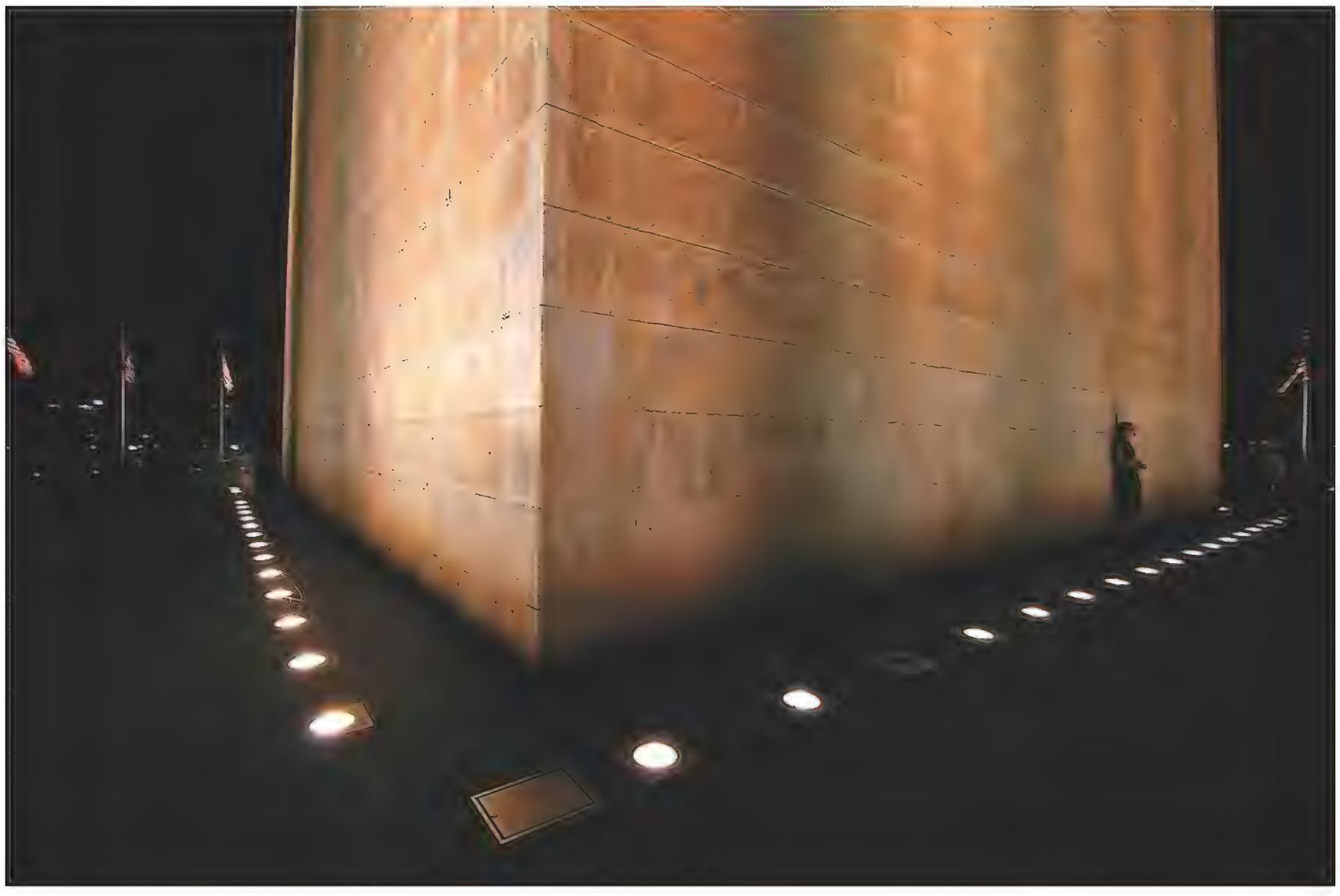
Masked dancers greeted Schneider's tour group on a visit to the village of Boni, well off the beaten track in West Africa's Burkina Faso, but he was drawn to a group of watchful boys instead. "I wanted to capture that look of curiosity of these kids," says Schneider.

WINNER, THE NATURAL WORLD
THOMAS VIGNAUD, AGE 22 • MARSEILLE, FRANCE
PHOTOGRAPHED SEPTEMBER 2007

"I'm an underwater photographer before all," says Vignaud, who photographed these juvenile fish and the jellyfish while diving off his father's sailboat. Some underwater photographers think "almost everything has been done already," he says. "I don't believe it."

WINNER, AMERICANA
LANCE WILLS, AGE 46
NORTH CHARLESTON, SOUTH CAROLINA
PHOTOGRAPHED APRIL 2007

Photographing the Washington Monument late one night, Wills watched tourists get up close to stroke the stone. "It struck me that like America itself, the Washington Monument could not be fully appreciated from afar. Its grandeur grows as you approach."



WINNER, ALTERED IMAGES
ANUPAM PAL, AGE 37 • KANPUR, INDIA
PHOTOGRAPHED DECEMBER 2007

The fountain was shot in Pennsylvania and the children (the photographer's niece and nephews) in Chakdaha, India. "The person in the background is me," says Pal. "The idea was to show the necessity of cleaner and safer water, not just for drinking but for everything."

READERS' CHOICE WINNER, AMERICANA
RHONDA WEIDERHAFT, AGE 46 • SANTA ANA, CALIFORNIA
PHOTOGRAPHED JUNE 2007

"This was the play that scored the winning run in the bottom of the last inning," says Weiderhaft of a championship Little League game between crosstown rivals in Orange County. "I focused my camera through the chain-link fence" to capture the moment of both thrilling victory and stunning defeat.

WINNER, TRAVEL

INDRANIL SENGUPTA, AGE 46 • HOOGHLY, INDIA

PHOTOGRAPHED NOVEMBER 2007

At an annual Chhath festival in the city of Agra, home of the Taj Mahal, Hindu women immersed in water pray to the sun for prosperity for two days. They celebrate the setting sun first, says Sengupta, then "welcome the fresh rising sun on the very next morning."

ABIGAIL TUCKER *is* SMITHSONIAN'S *staff writer.*

To see the 50 finalists, go to Smithsonian.com/photocontest

GOD'S COUNTRY
"Yosemite Valley [c. 1865] was the ultimate pilgrimage site for Victorian Americans. Here was the absolute manifestation of the divine," says Muir scholar Bonnie Gisel.

JOHN MUIR'S Yosemite

The father of the conservation movement found his calling on a visit to the California wilderness

BY TONY PERROTTET

THE NATURALIST JOHN MUIR is so closely associated with Yosemite National Park—after all, he helped draw up its proposed boundaries in 1889, wrote the magazine articles that led to its creation in 1890 and co-founded the Sierra Club in 1892 to protect it—that you'd think his first shelter there would be well marked. But only park historians and a few Muir devotees even know where the little log cabin was, just yards from the Yosemite Falls Trail. Maybe that's not such a bad thing, for here one can experience the Yosemite that inspired Muir. The crisp summer morning that I was guided to the site, the mountain air was perfumed with ponderosa and cedar; jays, larks and ground

squirrels gamboled about. And every turn offered picture-postcard views of the valley's soaring granite cliffs, so majestic that early visitors compared them to the walls of Gothic cathedrals. No wonder many 19th-century travelers who visited Yosemite saw it as a new Eden.

Leading me through the forest was Bonnie Gisel, curator of the Sierra Club's LeConte Memorial Lodge and the author of several books on Muir. "Yosemite Valley was the ultimate pilgrimage site for Victorian Americans," Gisel said. "Here was the absolute manifestation of the divine, where they could celebrate God in nature." We were in a cool, shady grotto filled with bracken fern and milkweed, as picturesque a place as fans of the drifter who would become America's most influential conservationist might wish. Although no structure remains, we know from Muir's diaries and letters that he built the one-room cabin from pine and cedar with his friend Harry Randall, and that he diverted nearby Yosemite Creek to run beneath its floor. "Muir loved the sound of water," Gisel explained. Plants grew through the floorboards; he wove the threads of two ferns into what he called an "ornamental arch" over his writing desk. And he slept on sheepskin blankets over cedar branches. "Muir wrote about frogs chirping under the floors as he slept," Gisel said. "It was like living in a greenhouse."

Today, Muir has become such an icon that it's hard to remember that he was ever a living human being, let alone a wide-eyed and adventurous young man—a Gilded Age flower child. Even at the Yosemite Visitor Center, he's depicted in a life-size bronze statue as a wizened prophet with a Methuselah beard. In a nearby museum, his battered tin cup and the traced outline of his foot are displayed like religious relics. And his pithy inspirational quotes—"Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine into trees"—are everywhere. But all this hero worship risks obscuring the real story of the man and his achievements.

"There are an amazing number of misconceptions about John Muir," says Scott Gediman, the park's public affairs officer. "People think he discovered Yosemite or started the national park system. Others assume he lived here all his life." In fact, says Gediman, Muir lived in Yosemite off and on for only a short but intense period from 1868 to 1874, an experience that transformed him into a successor to Henry David Thoreau and Ralph Waldo Emerson. Later in life, Muir would return to Yosemite on shorter trips, burdened with his own celebrity and the responsibilities of family and work. But it was during the happy period of his relative youth, when he was

VOICE FOR THE WILDERNESS
"Everybody needs beauty . . . places to play and pray in, where Nature may heal and cheer and give strength to body and soul alike," wrote Muir (top: c. 1902).

CORBIS; MAP: GUILBERT GATES; PP. 48-49 THE LAWRENCE AND HOUSEWORTH PHOTOGRAPHY ALBUMS, 1860-1870 CALIFORNIA VIEWS / SOCIETY OF CALIFORNIA PIONEERS; P. 49 GERRY ELLIS / MINDEN PICTURES

free to amble around Yosemite, that Muir's ideas were shaped. Some of his most famous adventures, recounted in his books *The Yosemite* and *Our National Parks*, were from this time.

"As a young man, Muir felt he was a student in what he called the 'University of the Wilderness,'" Gisel said. "Yosemite was his graduate course. This is where he decided who he was, what he wanted to say and how he was going to say it."

LIVING HISTORY
"No other tree in the world," wrote Muir, " . . . has looked down on so many centuries as the Sequoia." (Top: early tourists in Mariposa Grove, c. 1890.)

WHEN HE FIRST strode into Yosemite in the spring of 1868, Muir was a scruffy Midwestern vagabond wandering the wilderness fringes of post-bellum America, taking odd jobs where he could. In retrospect, visiting Yosemite might seem an inevitable stop on his life's journey. But his later recollections reveal a young man plagued with self-doubt and uncertainty, often lonely and confused about the future. "I was tormented with soul hunger," he wrote of his meandering youth. "I was on the world. But was I in it?"

John Muir was born in Dunbar, Scotland, in 1838, the eldest son of a Calvinist shopkeeper father. When John was 11, the family immigrated to the United States, to homestead near Portage, Wisconsin. Though his days were consumed with farm work, he was a voracious reader. By his mid-20s, Muir seemed to have a career as an inventor ahead of him. His gadgets included an "early-rising bed," which raised the sleeper to an upright position, and a clock made in the shape of a scythe, to signify the advance of Father Time. But after being nearly blinded in a factory mishap in 1867, Muir decided to devote his life to studying the beauties of Creation. With almost no money and already sporting the full beard that would become his trademark, he set off on a 1,000-mile walk from Kentucky to Florida, intending to continue to South America to see the Amazon. But a bout of malaria in Florida's Cedar Key forced a change in plans. He sailed to San Francisco via Panama, intending to stay only a short time.

Muir would later famously, and perhaps apocryphally, recall that after hopping off the boat in San Francisco on March 28, 1868, he asked a carpenter on the street the quickest way out of the chaotic city. "Where do you want to go?" the carpenter replied, and Muir responded, "Anywhere that is wild." Muir started walking east.

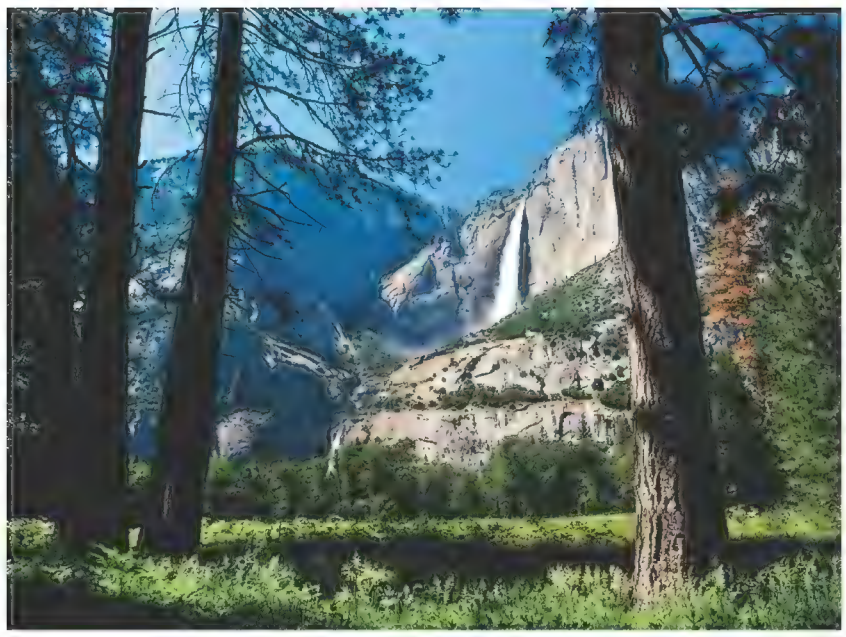
This glorious landscape had an ignoble history. The first white visitors were vigilantes from the so-called Mariposa Battalion, who were paid by the California government to stop Indian raids on trading posts. They rode into Yosemite in 1851 and 1852 in pursuit of the Ahwahneechee, a branch of the southern Miwok. Some Indians were killed and their village was burned. The survivors were driven from the valley and returned later only in small, heartbroken bands. The vigilantes brought back stories of a breathtaking seven-mile-long gorge framed by monumental cliffs, now known as El Capitan and Half Dome, and filled with serene meadows and spectacular waterfalls.

The first tourists began arriving in Yosemite a few years later, and by the early 1860s, a steady trickle of them, most from San Francisco, 200 miles away, was turning up in summer. Traveling for several days by train, stagecoach and horseback, they would reach Mariposa Grove, a stand of some 200 ancient giant sequoias, where they would rest before embarking on an arduous descent via 26 switchbacks into the valley. Once there, many did not stray far from the few rustic inns, but others would camp out in the forests, eating oatcakes and drinking tea, hiking to mountain vistas such as Glacier Point, reading poetry around campfires and yodeling across moonlit lakes. By 1864, a group of Californians, aware of what had happened to Niagara Falls, successfully lobbied President Abraham Lincoln to sign a law granting the roughly seven square miles of the valley and Mariposa Grove to the state "for public use, resort and recreation"—some of the first land in history set aside for its natural beauty.

Thus, when Muir came to Yosemite in 1868, he found several dozen year-round residents living in the valley—even an apple orchard. Because of a gap in his journals, we know little about that first visit except that it lasted about ten days. He returned to the coast to find work, promising himself to return.

It would take him over a year to do so. In June 1869, Muir signed on as a shepherd to take a flock of 2,000 sheep to Tuolumne Meadows in the High Sierra, an adventure he later recounted in one of his most appealing books, *My First Summer in the Sierra*. Muir came to despise his "hoofed lo-

REUNION DES MUSEES NATIONAUX / ART RESOURCE, NY; BILL HATCHER / NATIONAL GEOGRAPHIC IMAGE COLLECTION



WATER WONDER
"Yosemite [Falls] is crowned with glory above its fellows," said Muir. It "comes to us as an endless revelation—mysterious, unreadable, immeasurable, yet holding its hearers spellbound with the divine majesty and loveliness of its forms and voices."

custs" for tearing up the grass and devouring wildflowers. But he discovered a dazzling new world. He made dozens of forays into the mountains, including the first ascent of the 10,911-foot granite spire of Cathedral Peak, with nothing but a notebook tied to his rope belt and lumps of hard bread in his coat pockets. By fall 1869, Muir had decided to stay full time in the valley, which he regarded as "nature's landscape garden, at once beautiful and sublime." He built and ran a sawmill for James Hutchings, proprietor of the Hutchings House hotel, and, in November 1869, constructed his fern-filled cabin by Yosemite Creek. Muir lived there for 11 months, guiding hotel guests on hikes and cutting timber for walls to replace bedsheets hung as "guest room" partitions. Muir's letters and journals find him spending hour after hour simply marveling at the beauty around him. "I am feasting in the Lord's mountain house," he wrote his lifelong Wisconsin friend and mentor Jeanne Carr, "and what pen may write my blessings?" But he missed his family and friends. "I find no human sympathy," he wrote at one low ebb, "and I hunger."

We have a vivid picture of Muir at this time thanks to Theresa Yelverton, a.k.a. Viscountess Avonmore, a British writer who arrived in Yosemite as a 33-year-old tourist in the spring of 1870. Carr had told her to seek out Muir as a guide and the pair became friends. She recorded her first impressions of him in the novel *Zanita: A Tale of the Yo-Semite*, a thinly veiled memoir in which Muir is called Kenmuir. He was dressed, she wrote, in "tattered trousers, the waist eked out with a grass band" and held up by "hay-rope suspenders," with "a long flowering sedge rush stuck in the solitary button-hole of his shirt, the sleeves of which were ragged and forlorn." But Yelverton also noted his "bright, intelligent face . . . and his open blue eyes of honest questioning," which she felt "might have stood as a portrait of the angel Raphael." On their many rambles, she came also to marvel at Muir's energy and charisma: muscular and agile, with a "joyous, ringing laugh," he leapt from boulder to boulder like a mountain goat, rhapsodizing about the wonders of God.

"These are the Lord's fountains," Kenmuir pronounces before one waterfall. "These are the reservoirs whence He pours his floods to cheer the earth, to refresh man and beast, to lave every sedge and tiny moss." When a storm sends trees thundering to the earth around them, Kenmuir is driven to ecstasy: "O, this is grand! This is magnificent! Listen to the voice of the Lord; how he speaks in the sublimity of his power and glory!" The other settlers, she writes, regarded him as slightly mad—"a born fool" who "loafs around this here valley gatherin' stocks and stones."

Muir left Yosemite abruptly in late 1870; some scholars suspect he was fleeing the romantic interest of Lady Yelverton, who had long been separated from a caddish husband. A short time later, in January 1871, Muir returned to Yosemite, where he would spend the next 22 months—his longest stint. On Sunday excursions away from the sawmill, he made detailed studies of the valley's geology, plants and animals, including the water ouzel, or dipper, a songbird that dives into swift streams in search of insects. He camped out on high ledges where he was doused by freezing waterfalls, lowered himself by ropes into "the womb" of a remote glacier and once "rode" an avalanche down a canyon. ("Elijah's flight in a chariot of fire could hardly have been more gloriously exciting," he said of the experience.)

In 1903, 65-year-old Muir and President Theodore Roosevelt were able to give Secret Service agents the slip and disappear for three days, camping in the wild.

This refreshingly reckless manner, as if he were drunk on nature, is what many fans like to remember about him today. "There has never been a wilderness advocate with the kind of hands-on experience of Muir," says Lee Stetson, editor of an anthology of Muir's outdoor adventure writing and an actor who has portrayed him in one-man shows in Yosemite for the past 25 years. "People tend to think of him as a remote philosopher-king, but there's probably not a single part of this park that he didn't visit himself." Not surprisingly, Native Americans, whom Muir regarded as "dirty," tend to be less enthusiastic about him. "I think Muir has been given entirely too much credit," says Yosemite park ranger

RICHARD I'ANSON / LONELY PLANET IMAGES; BETTMANN / CORBIS; P. 52 CARLETON WATKINS / LIBRARY OF CONGRESS, PRINTS AND PHOTOGRAPHS DIVISION

WILD AT HEART

A Yosemite program introduces kids to the great outdoors

AT 9 A.M. THE MORNING FOG is beginning to lift from eastern Yosemite Valley. Thirteen sixth graders are milling around, preparing to set off on a daylong excursion. Bundled in fleece jackets against the chilly air, the kids are chattering about their ultimate destination: Yosemite's "Spider Caves." One rumor—that it's pitch-dark in there—is true. But others just may be exaggerated. "My sister has been there before; she said you can fall a really long way," says 11-year-old Charles Healow.

The students have converged here under the auspices of the Yosemite National Institutes, a nonprofit organization dedicated to connecting young people with this magnificent wilderness, using its 761,000 acres as a classroom. On weeklong outdoor-education outings in Yosemite, iPods and laptops are banned. For many of these sixth graders, all of whom attend the Notre Dame des Victoires school in San Francisco, going unplugged is a rude awakening. Ordinarily, admits 11-year-old Kenny Tankeh, "I'd be home right now, watching TV." The institute estimates that school-age children across the nation spend, on average, fewer than eight minutes outside each day. "We're aiming to be the antidote to this nature deficit disorder," says the organization's Adam Burns.

UNPLUGGED: **Ordinarily, "I'd be home . . . now, watching TV."**

Today the instructors are leading 20 student groups into the park. During an academic year, more than 14,000 kids will trek here. Most attend schools in California; this week's groups include a contingent from New York City. Last month, students came from as far away as Beijing.

The wilderness immersion programs were started in 1971, when Santa Barbara high-school teacher Don Rees brought a class to Yosemite. That same year, in cooperation with Rees, the National Park Service expanded his idea to help create the Yosemite National Institutes. The fledgling venture benefited from the support of several high-profile board members, including astronaut Bill Anders and actor Robert Redford, who had worked in Yosemite after high school.

EARLY IN THE AFTERNOON, the Notre Dame des Victoires group, led by institute staffer Laura Manczewski, clambers up a rocky slope to the Spider Caves. The youngsters lower themselves into impenetrable darkness. "I can't find my foot!" yells 12-year-old Charles Kieser from the inky gloom. "I lost my right foot!" Ten minutes and 100 feet later, the students emerge one at a time through a crevice, smiling and squinting into the light.

Manczewski tells everyone to sit on the grass and write in their journals. A half-hour later, Kieser volunteers to share his musings. "The Spider Caves are like life, because you can't always see ahead of you," he reads, "but if you keep going, you'll find your way." It's the kind of road-less-traveled insight that John Muir himself might well have understood—and appreciated. **—REID PILLIFANT**

To see more Yosemite pictures from the 1800s, visit Smithsonian.com/yosemite

Ben Cunningham-Summerfield, a member of the Maidu tribe of Northern California.

In early 1871, Muir had been obliged to leave his idyllic creek-side cabin, which Hutchings wanted to use for his relatives. With his usual inventiveness, Muir built a small study in the sawmill under a gable reachable only by ladder, which he called his "hang-nest." There, surrounded by the many plant specimens he'd gathered on his rambles, he filled journal after journal with his observations of nature and geology, sometimes writing with sequoia sap for added effect. Thanks to Jeanne Carr, who had moved to Oakland and hobnobbed with California's literati, Muir was beginning to develop a reputation as a self-taught genius. The noted scientist Joseph LeConte was so impressed with one of his theories—that the Yosemite Valley had been formed by glacial activity rather than a prehistoric cataclysm, as was widely, and incorrectly, thought—that he encouraged Muir to publish his first article, which appeared in the *New York Tribune* in late 1871. Ralph Waldo Emerson, by then elderly, spent days with Muir peppering him with botanical questions. (The pair went to Mariposa Grove, but much to Muir's disappointment, Emerson was too frail to camp overnight.)

Native Americans tend to be less enthusiastic about the naturalist. "I think Muir has been given entirely too much credit," says park ranger Ben Cunningham-Summerfield.

By the end of 1872, Muir was making occasional appearances in the salons of San Francisco and Oakland, where Carr introduced him as "the wild man of the woods." Writing for outdoor magazines, Muir was able to put his ideas about nature into the vernacular, but he wrestled not only with the act of writing but with the demands of activism. Part of him wanted to simply return to the park and revel in nature. But by the fall of 1874, having visited the valley after a nine-month absence, he concluded that that option was no longer open to him. He had a calling, to protect the wilderness, which required his presence in the wider world. "This chapter of my life is done," he wrote to Carr from Yosemite. "I feel I am a stranger here." Muir, 36, returned to San Francisco.

"Yosemite had been his sanctuary," says Gisel. "The question was now how to protect it. By leaving, he was accepting his new responsibility. He had been a guide for individuals. Now he would be a guide for humanity."

As a celebrated elder statesman of American conservation, he continued to visit Yosemite on a regular basis. In 1889, in his early 50s, Muir camped with Robert Underwood Johnson, an editor of *Century* magazine, in Tuolumne

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Frequent contributor **TONY PERROTTET** *wrote about Europe's house museums for the June 2008 issue of* SMITHSONIAN.

JOHN LEE / AURORA SELECT

O' YOSEMITE
"The rose light of the dawn, creeping higher among the stars changes to daffodil yellow, then come the yellow enthusiastic sunbeams pouring across the feathery ridges, touching pine after pine . . . searching every recess until all are awakened and warmed," wrote Muir. Above, Yosemite Valley as it appeared in a c. 1865 photograph by Carleton Watkins from the Tunnel View lookout and, left, today.

Meadows, where he had worked as a shepherd in 1869. Together they devised a plan to create a 1,200-square-mile Yosemite National Park, a proposal Congress passed the following year. In 1903, the 65-year-old Muir and President Theodore Roosevelt were able to give Secret Service agents the slip and disappear for three days, camping in the wild. It was during this excursion, historians believe, that Muir persuaded the president to expand the national park system and to combine, under federal authority, both Yosemite Valley and Mariposa Grove, which had remained under California jurisdiction as authorized by Lincoln decades before. Unification of the park came in 1906.

But just when Muir should have been able to relax, he learned in 1906 that a dam was planned within the park boundaries, in the lovely Hetch Hetchy Valley. Despite a hard fight, he was unable to stop its construction, which Congress authorized in 1913, and he succumbed to pneumonia the next year in 1914, at age 76. But the defeat galvanized the American conservation movement to push for the creation in 1916 of the National Park Service and a higher level of protection for all national parks—a memorial Muir would have relished.

CARLETON WATKINS / LIBRARY OF CONGRESS, PRINTS AND PHOTOGRAPHS DIVISION; COSMO CONDINA / MIRA.COM / DRR.NET

The Great Human Migratio

Why humans left their African homeland 80,000 years ago to colonize the world

By Guy Gugliotta

Seventy-seven thousand years ago,

a craftsman sat in a cave in a limestone cliff overlooking the rocky coast of what is now the Indian Ocean. It was a beautiful spot, a workshop with a glorious natural picture window, cooled by a sea breeze in summer, warmed by a small fire in winter. The sandy cliff top above was covered with a white-flowering shrub that one distant day would be known as blombos and give this place the name Blombos Cave.

Blombos Cave held signs of early human creativity.

The man picked up a piece of reddish brown stone about three inches long that he—or she, no one knows—had polished. With a stone point, he etched a geometric design in the flat surface—simple crosshatchings framed by two parallel lines with a third line down the middle.

The oldest known human fossils (opposite top: a 160,000-year-old skull from Herto, Ethiopia) help scientists trace our origins to Africa. Behavior is harder to determine, but stone tools (points and an etched design, all from Blombos Cave) may well reflect a sudden flowering of *Homo sapiens* creativity.

Today the stone offers no clue to its original purpose. It could have been a religious object, an ornament or just an ancient doodle. But to see it is to immediately recognize it as something only a person could have made. Carving the stone was a very human thing to do.

The scratchings on this piece of red ocher mudstone are the oldest known example of an intricate design made by a human being. The ability to create and communicate using such symbols, says Christopher Henshilwood, leader of the team that discovered the stone, is "an unambiguous

marker" of modern humans, one of the characteristics that separate us from any other species, living or extinct.

Henshilwood, an archaeologist at Norway's University of Bergen and the University of the Witwatersrand, in South Africa, found the carving on land owned by his grandfather, near the southern tip of the African continent. Over the years, he had identified and excavated nine sites on the property, none more than 6,500 years old, and was not at first interested in this cliffside cave a few miles from the South African town of Still Bay. What he would find there, however, would change the way scientists think about the evolution of modern humans and the factors that triggered perhaps the most important event in human prehistory, when *Homo sapiens* left their African homeland to colonize the world.

This great migration brought our species to a position of world dominance that it has never relinquished and signaled the extinction of whatever competitors remained—Neanderthals in Europe and Asia, some scattered pockets of *Homo erectus* in the Far East and, if scholars ultimately decide they are in fact a separate species, some diminutive people from the Indonesian island of Flores (see "Were 'Hobbits' Human?", p. 61). When the migration was complete, *Homo sapiens* was the last—and only—man standing.

Even today researchers argue about what separates modern humans from other, extinct hominids. Generally speaking, moderns tend to be a slimmer, taller breed: "gracile," in scientific parlance, rather than "robust," like the heavy-boned Neanderthals, their contemporaries for perhaps 15,000 years in ice age Eurasia. The modern and Neanderthal brains were about the same size, but their skulls were shaped differently: the newcomers' skulls were flatter in back than the Neanderthals', and they had prominent jaws and a straight forehead without heavy brow ridges. Lighter bodies may have meant that modern humans needed less food, giving

Christopher Henshilwood (in Blombos Cave) dug at one of the most important early human sites partly out of proximity—it's on his grandfather's property.

CENTRE FOR DEVELOPMENT STUDIES, UNIVERSITY OF BERGEN, NORWAY; P. 56 DAVID L. BRILL; CENTRE FOR DEVELOPMENT STUDIES, UNIVERSITY OF BERGEN, NORWAY (2); P. 57 CENTRE FOR DEVELOPMENT STUDIES, UNIVERSITY OF BERGEN, NORWAY; MAP: PEDRO VELASCO / SW INFOGRAPHICS

them a competitive advantage during hard times.

The moderns' behaviors were also different. Neanderthals made tools, but they worked with chunky flakes struck from large stones. Modern humans' stone tools and weapons usually featured elongated, standardized, finely crafted blades. Both species hunted and killed the same large mammals, including deer, horses, bison and wild cattle. But moderns' sophisticated weaponry, such as throwing spears with a variety of carefully wrought stone, bone and antler tips, made them more successful. And the tools may have kept them relatively safe; fossil evidence shows Neanderthals suffered grievous injuries, such as gorings and bone breaks, probably from hunting at close quarters with short, stone-tipped pikes and stabbing spears. Both species had rituals—Neanderthals buried their dead—and both made ornaments and jewelry. But the moderns produced their artifacts with a frequency and expertise that Neanderthals never matched. And Neanderthals, as far as we know, had nothing like the etching at Blombos Cave, let alone the bone carvings, ivory flutes and, ultimately, the mesmerizing cave paintings and rock art that modern humans left as snapshots of their world.

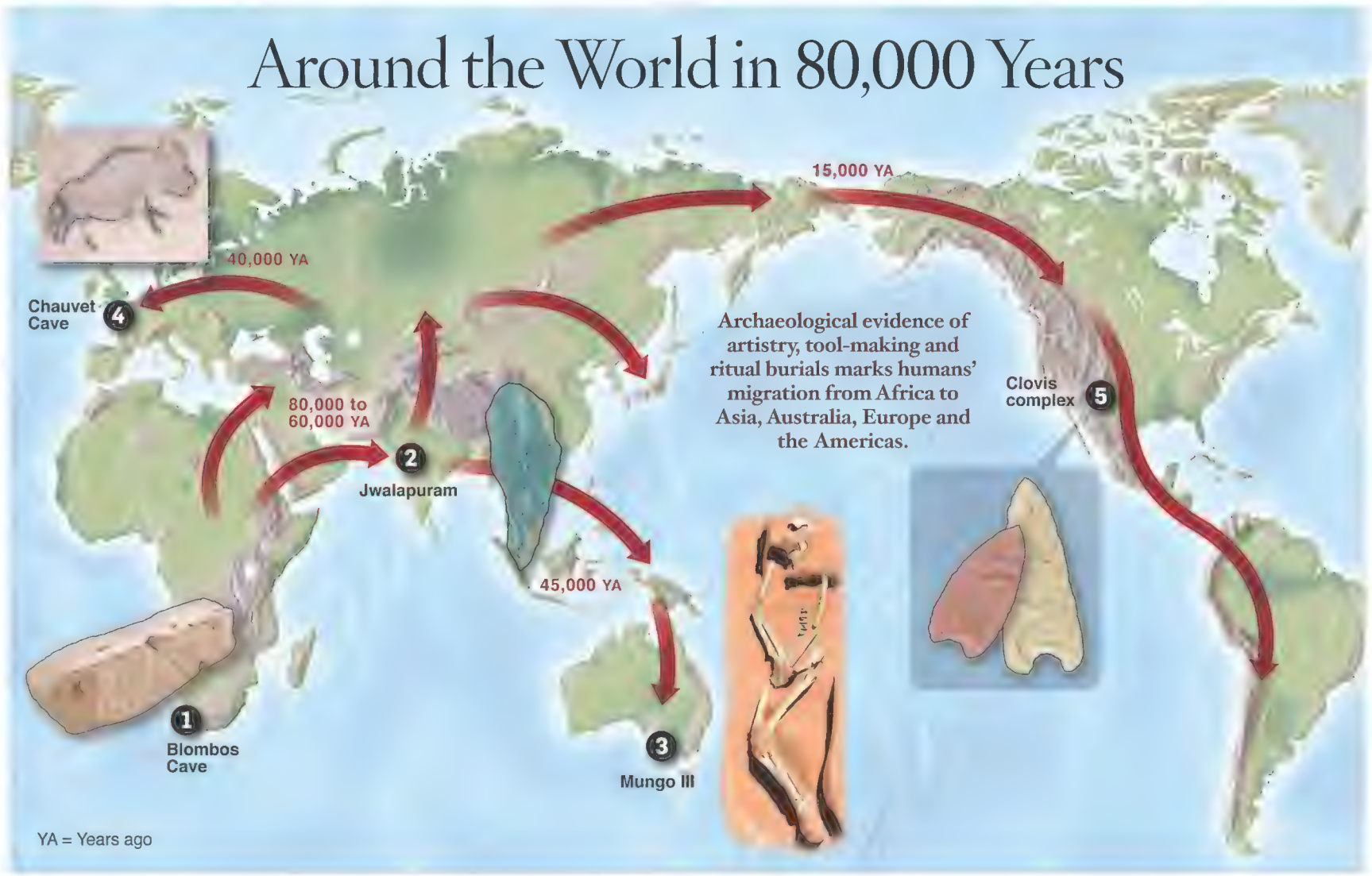
Compared with Neanderthals (left), humans are "gracile."

Both species had rituals and made ornaments, but the Neanderthals had nothing like the etching at Blombos Cave.

When the study of human origins intensified in the 20th century, two main theories emerged to explain the archaeological and fossil record: one, known as the multi-regional hypothesis, suggested that a species of human ancestor dispersed throughout the globe, and modern humans evolved from this predecessor in several different locations. The other, out-of-Africa theory, held that modern humans evolved in Africa for many thousands of years before they spread throughout the rest of the world.

In the 1980s, new tools completely changed the kinds of questions that scientists could answer about the past. By analyzing DNA in living human populations, geneticists could trace lineages backward in time. These analyses have provided key support for the out-of-Africa theory. *Homo sapiens*, this new evidence has repeatedly shown, evolved in Africa, probably around 200,000 years ago.

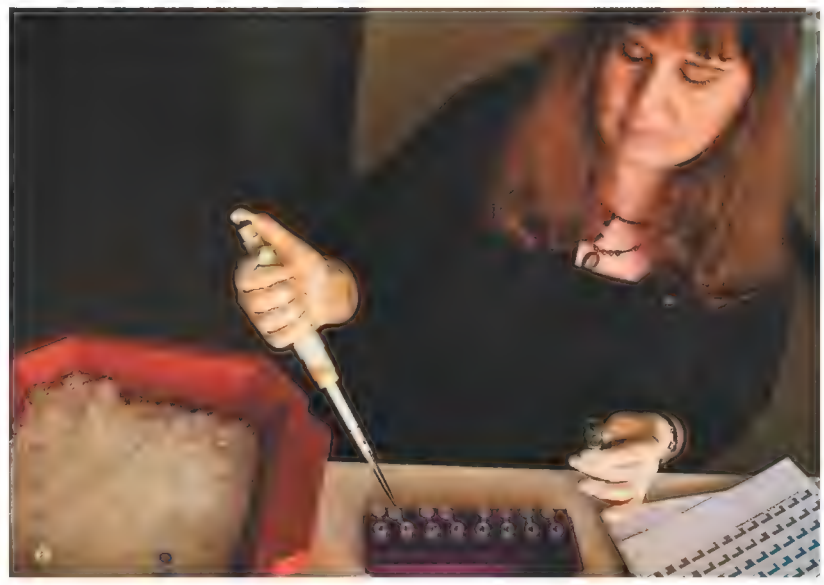
The first DNA studies of human evolution didn't use the



PASCAL GOETGHELUCK / PHOTO RESEARCHERS; MAP: 5W INFOGRAPHICS; MAP ILLUSTRATIONS: PEDRO VELASCO

DNA in a cell's nucleus—chromosomes inherited from both father and mother—but a shorter strand of DNA contained in the mitochondria, which are energy-producing structures inside most cells. Mitochondrial DNA is inherited only from the mother. Conveniently for scientists, mitochondrial DNA has a relatively high mutation rate, and mutations are carried along in subsequent generations. By comparing mutations in mitochondrial DNA among today's populations, and making assumptions about how frequently they occurred, scientists can walk the genetic code backward through generations, combining lineages in ever larger, earlier branches until they reach the evolutionary trunk.

Scientists blend DNA analysis with archaeological and fossil evidence to create a coherent whole—no easy task.



Sarah Tishkoff uses DNA analysis to understand our origins.

At that point in human history, which scientists have calculated to be about 200,000 years ago, a woman existed whose mitochondrial DNA was the source of the mitochondrial DNA in every person alive today. That is, all of us are her descendants. Scientists call her "Eve." This is something of a misnomer, for Eve was neither the first modern human nor the only woman alive 200,000 years ago. But she did live at a time when the modern human population was small—about 10,000 people, according to one estimate. She is the only woman from that time to have an unbroken lineage of daughters, though she is neither our only ancestor nor our oldest ancestor. She is, instead, simply our "most recent common ancestor," at least when it comes to mitochondria. And Eve, mitochondrial DNA backtracking showed, lived in Africa.

Subsequent, more sophisticated analyses using DNA from the nucleus of cells have confirmed these findings, most recently in a study this year comparing nuclear DNA from 938 people from 51 parts of the world. This research, the most comprehensive to date, traced our common ancestor to Africa and clarified the ancestries of several populations in Europe and the Middle East.

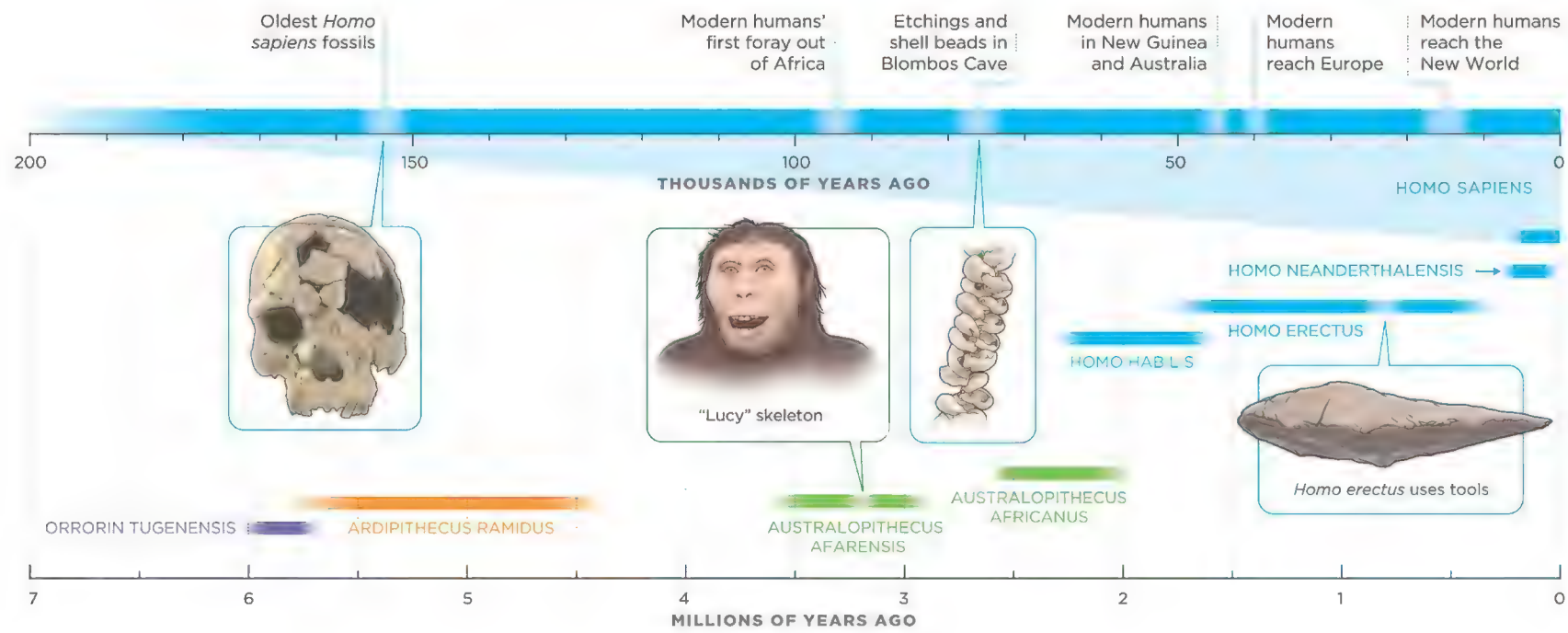
While DNA studies have revolutionized the field of paleoanthropology, the story "is not as straightforward as people think," says University of Pennsylvania geneticist Sarah A. Tishkoff. If the rates of mutation, which are largely inferred, are not accurate, the migration timetable could be off by thousands of years.

To piece together humankind's great migration, scientists blend DNA analysis with archaeological and fossil evidence to try to create a coherent whole—no easy task. A disproportionate number of artifacts and fossils are from Europe—where researchers have been finding sites for well over 100 years—but there are huge gaps elsewhere. "Outside the Near East there is almost nothing from Asia, maybe ten dots you could put on a map," says Texas A&M University anthropologist Ted Goebel.

As the gaps are filled, the story is likely to change, but in broad outline, today's scientists believe that from their begin-

Hominid Family History

Modern humans are a relatively recent offshoot of the family tree.



ANDREW HENDERSON; TIMELINE: 5W INFOGRAPHICS, TIMELINE ILLUSTRATIONS: PEDRO VELASCO

nings in Africa, the modern humans went first to Asia between 80,000 and 60,000 years ago. By 45,000 years ago, or possibly earlier, they had settled Indonesia, Papua New Guinea and Australia. The moderns entered Europe around 40,000 years ago, probably via two routes: from Turkey along the Danube corridor into eastern Europe, and along the Mediterranean coast. By 35,000 years ago, they were firmly established in most of the Old World. The Neanderthals, forced into mountain strongholds in Croatia, the Iberian Peninsula, the Crimea and elsewhere, would become extinct 25,000 years ago. Finally, around 15,000 years ago, humans crossed from Asia to North America and from there to South America.

Africa is relatively rich in the fossils of human ancestors who lived millions of years ago (see timeline, opposite). Lush, tropical lake country at the dawn of human evolution provided one congenial living habitat for such hominids as *Australopithecus afarensis*. Many such places are dry today, which makes for a congenial exploration habitat for paleontologists. Wind erosion exposes old bones that were covered in muck millions of years ago. Remains of early *Homo sapiens*, by contrast, are rare, not only in Africa, but also in Europe. One suspicion is that the early moderns on both continents did not—in contrast to Neanderthals—bury their dead, but either cremated them or left them to decompose in the open.

In 2003, a team of anthropologists reported the discovery of three unusual skulls—two adults and a child—at Herto, near the site of an ancient freshwater lake in northeast Ethiopia. The skulls were between 154,000 and 160,000 years old and had modern characteristics, but with some archaic features. "Even now I'm a little hesitant to call them anatomically modern," says team leader Tim White, from the University of California at Berkeley. "These are big, robust people, who haven't quite evolved into modern humans. Yet they are so close you wouldn't want to give them a different species name."

The Herto skulls fit with the DNA analysis suggesting that modern humans evolved some 200,000 years ago. But they also raised questions. There were no other skeletal remains at the site (although there was evidence of butchered hippopotamuses), and all three skulls, which were nearly complete except for jawbones, showed cut marks—signs of scraping with stone tools. It appeared that the skulls had been deliberately detached from their skeletons and defleshed. In fact, part of the child's skull was highly polished. "It is hard to argue that this is not some kind of mortuary ritual," White says.

Even more provocative were discoveries reported last year. In a cave at Pinnacle Point in South Africa, a team led by Ari-

GUY GUGLIOTTA *has written about cheetahs, Fidel Castro and London's Old Bailey courthouse for* SMITHSONIAN.

MAURICIO ANTON / PHOTO RESEARCHERS

Were "Hobbits" Human?

Debate rages over an Indonesian fossil find

IN 2003, RESEARCHERS EXCAVATING a limestone cave on the remote Indonesian island of Flores made an extraordinary discovery: the 18,000-year-old bones of a woman whose skull was less than one-third the size of our own.

Modern humans were already living throughout the Old World during her time—yet she was physically very different from them. The researchers, led by paleoanthropologist Peter Brown and archaeologist Michael Morwood, both of Australia's University of New England, concluded that the woman represented a previously undiscovered species of archaic human that had survived for thousands of years after the Neanderthals had died out.

They named her *Homo floresiensis* and nicknamed her the "Hobbit," after the diminutive villagers from J.R.R. Tolkien's *Lord of the Rings* trilogy. The team has since recovered bones from as many as nine such people, all about a yard tall, the most recent of whom lived about 12,000 years ago.

The Hobbits of Flores created an uproar among anthropologists, causing them to question assumptions about evolution and human origins that had held sway for more than half a century. Some agree that the "Hobbits" are a distinct species. But others, such as anthropologist Robert Martin of Chicago's Field Museum, say the bones belong to small *Homo sapiens*—perhaps people who suffered from microcephaly, a condition in which the brain fails to grow to normal size. Five years after the initial discovery, says Martin, "nobody's budging an inch."

***Homo floresiensis* (with dwarf elephant): Were they small humans—or a new species?**

Some critics say that it would have been impossible for a hominid with a brain the size of an orange to make the sophisticated tools found at Ling Bua Cave—let alone hunt with them—and that they must have been crafted by modern humans. But supporters of the separate species hypothesis modeled the shape and structure of the Hobbit brain and say it could have made the tools.

When Smithsonian anthropologist Matthew Tocheri and other researchers analyzed the Hobbitt wrist, they found a primitive, wedge-shaped trapezoid bone common to great apes and early hominids but not to Neanderthals and modern humans. That fits a theory that Hobbits are less closely related to *Homo sapiens* than to *Homo erectus*—the human ancestor that is thought to have died out 100,000 years ago. Morwood has found crude *Homo erectus*-type stone tools on Flores that may be 840,000 years old.

The skeptics retort that disease is a more likely explanation for the wrist bones. A study this year speculated that the Flores people could have suffered from hypothyroidism, a form of cretinism found relatively frequently in modern Indonesia that, the researchers say, could also produce deformed, primitive-appearing wrists.

Rick Potts, director of the Smithsonian's Human Origins Program, who once doubted that the Hobbits were a separate species, says he's changed his mind: "Flores was this wing in the building of human evolution that we didn't know about. There is no reason that 800,000 years of experimentation could not evolve a small but advanced brain." —*G.G.*

Neanderthals (left) overlapped with modern humans for about 15,000 years (until 25,000 years ago), which may explain why humans' first foray from Africa was unsuccessful.

zona State University paleoanthropologist Curtis Marean found evidence that humans 164,000 years ago were eating shellfish, making complex tools and using red ocher pigment—all modern human behaviors. The shellfish remains—of mussels, periwinkles, barnacles and other mollusks—indicated that humans were exploiting the sea as a food source at least 40,000 years earlier than previously thought.

The first archaeological evidence of a human migration out of Africa was found in the caves of Qafzeh and Skhul, in present-day Israel. These sites, initially discovered in the 1930s, contained the remains of at least 11 modern humans. Most appeared to have been ritually buried. Artifacts at the site, however, were simple: hand axes and other Neanderthal-style tools.

"You may be anatomically modern and display modern behaviors, but apparently it wasn't enough."

At first, the skeletons were thought to be 50,000 years old—modern humans who had settled in the Levant on their way to Europe. But in 1989, new dating techniques showed them to be 90,000 to 100,000 years old, the oldest modern human remains ever found outside Africa. But this excursion appears to be a dead end: there is no evidence that these moderns survived for long, much less went on to colonize any other parts of the globe. They are therefore not considered to be a part of the migration that followed 10,000 or 20,000 years later.

Intriguingly, 70,000-year-old Neanderthal remains have been found in the same region. The moderns, it would appear, arrived first, only to move on, die off because of disease or natural catastrophe or—possibly—get wiped out. If they shared territory with Neanderthals, the more "robust" species may have outcompeted them here. "You may be anatomically modern and display modern behaviors," says paleoanthropologist Nicholas J. Conard of Germany's University of Tübingen, "but apparently it wasn't enough. At that point the two species are on pretty equal footing." It was also at this point in history, scientists concluded, that the Africans ceded Asia to the Neanderthals.

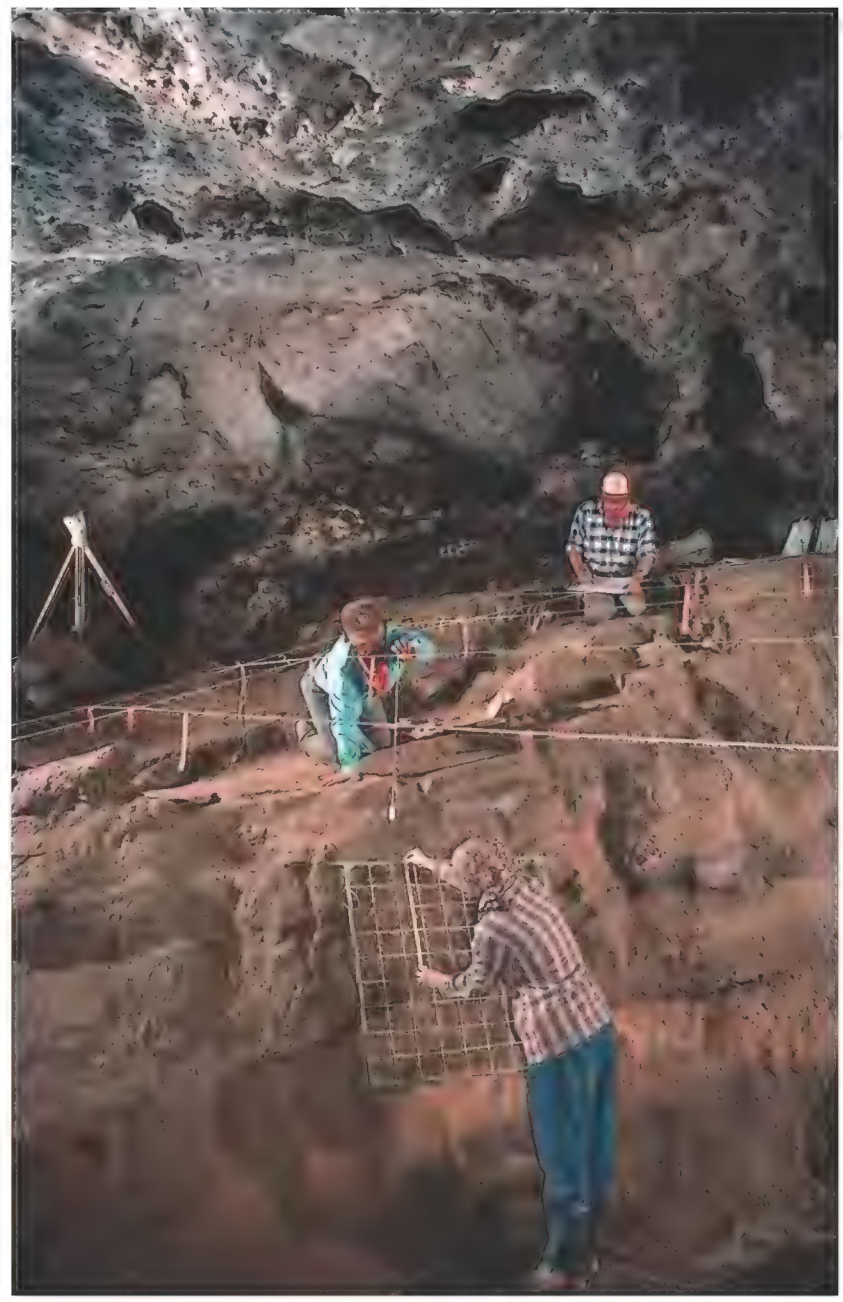
Then, about 80,000 years ago, says Blombos archaeologist Henshilwood, modern humans entered a "dynamic period" of innovation. The evidence comes from such South

Learn how scientists date fossils at Smithsonian.com/migration

DAVID L. BRILL (2)

African cave sites as Blombos, Klasies River, Diepkloof and Sibudu. In addition to the ocher carving, the Blombos Cave yielded perforated ornamental shell beads—among the world's first known jewelry. Pieces of inscribed ostrich eggshell turned up at Diepkloof. Hafted points at Sibudu and elsewhere hint that the moderns of southern Africa used throwing spears and arrows. Fine-grained stone needed for careful workmanship had been transported from up to 18 miles away, which suggests they had some sort of trade. Bones at several South African sites showed that humans were killing eland, springbok and even seals. At Klasies River, traces of burned vegetation suggest that the ancient hunter-gatherers may have figured out that by clearing land, they could encourage quicker growth of edible roots and tubers. The sophisticated bone tool and stoneworking technologies at these sites were all from roughly the same time period—between 75,000 and 55,000 years ago.

Seafood (below: giant periwinkles) may have fueled early humans' brains; a taste for mollusks emerged some 160,000 years ago (right: South Africa's Klasies Cave).



Virtually all of these sites had piles of seashells. Together with the much older evidence from the cave at Pinnacle Point, the shells suggest that seafood may have served as a nutritional trigger at a crucial point in human history, providing the fatty acids that modern humans needed to fuel their outsize brains: "This is the evolutionary driving force," says University of Cape Town archaeologist John Parkington. "It is sucking people into being more cognitively aware, faster-wired, faster-brained, smarter." Stanford University paleoanthropologist Richard Klein has long argued that a genetic mutation at roughly this point in human history provoked a sudden increase in brainpower, perhaps linked to the onset of speech.

Did new technology, improved nutrition or some genetic mutation allow modern humans to explore the world? Possibly, but other scholars point to more mundane factors that may have contributed to the exodus from Africa. A recent DNA study suggests that massive droughts before the great migration split Africa's modern human population into small, isolated groups and may have even threatened their extinction. Only after the weather improved were the survivors able to reunite, multiply and, in the end, emigrate. Improvements in technology may have helped some of them set out for new territory. Or cold snaps may have lowered sea level and opened new land bridges.

Whatever the reason, the ancient Africans reached a watershed. They were ready to leave, and they did.

DNA evidence suggests the original exodus involved anywhere from 1,000 to 50,000 people. Scientists do not agree on the time of the departure—sometime more recently than 80,000 years ago—or the departure point, but most now appear to be leaning away from the Sinai, once the favored location, and toward a land bridge crossing what today is the Bab el Mandeb Strait separating Djibouti from the Arabian Peninsula at the southern end of the Red Sea. From there, the thinking goes, migrants could have followed a southern route eastward along the coast of the Indian Ocean. "It could have been almost accidental," Henshilwood says, a path of least resistance that did not require adaptations to different climates, topographies or diet. The migrants' path never veered far from the sea, departed from warm weather or failed to provide familiar food, such as shellfish and tropical fruit.

Tools found at Jwalapuram, a 74,000-year-old site in southern India, match those used in Africa from the same period. Anthropologist Michael Petraglia of the University of Cambridge, who led the dig, says that although no human fossils have been found to confirm the presence of modern humans at Jwalapuram, the tools suggest it is the earliest known settlement of modern humans outside of Africa except for the dead enders at Israel's Qafzeh and Skhul sites.

And that's about all the physical evidence there is for tracking the migrants' early progress across Asia. To the south, the fossil and archaeological record is clearer and shows that modern humans reached Australia and Papua

IRA BLOCK (2)

New Guinea—then part of the same landmass—at least 45,000 years ago, and maybe much earlier.

But curiously, the early down under colonists apparently did not make sophisticated tools, relying instead on simple Neanderthal-style flaked stones and scrapers. They had few ornaments and little long-distance trade, and left scant evidence that they hunted large marsupial mammals in their new homeland. Of course, they may have used sophisticated wood or bamboo tools that have decayed. But University of Utah anthropologist James F. O'Connell offers another explanation: the early settlers did not bother with sophisticated technologies because they did not need them. That these people were "modern" and innovative is clear: getting to New Guinea-Australia from the mainland required at least one sea voyage of more than 45 miles, an astounding achievement. But once in place, the colonists faced few pressures to innovate or adapt new technologies. In particular, O'Connell notes, there were few people, no shortage of food and no need to compete with an indigenous population like Europe's Neanderthals.

Modern humans eventually made their first forays into Europe only about 40,000 years ago, presumably delayed by relatively cold and inhospitable weather and a less than welcoming Neanderthal population. The conquest of the continent—if that is what it was—is thought to have lasted about 15,000 years, as the last pockets of Neanderthals dwindled to extinction. The European penetration is widely regarded as the decisive event of the great migration, eliminating as it did our last rivals and enabling the moderns to survive there uncontested.

Did modern humans wipe out the competition, absorb them through interbreeding, outthink them or simply stand by while climate, dwindling resources, an epidemic or some other natural phenomenon did the job? Perhaps all of the above. Archaeologists have found little direct evidence of confrontation between the two peoples. Skeletal evidence of possible interbreeding is sparse, contentious and inconclusive. And while interbreeding may well have taken place, recent DNA studies have failed to show any consistent genetic relationship between modern humans and Neanderthals.

"You are always looking for a neat answer, but my feeling is that you should use your imagination," says Harvard University archaeologist Ofer Bar-Yosef. "There may have been positive interaction with the diffusion of technology from one group to the other. Or the modern humans could have killed off the Neanderthals. Or the Neanderthals could have just died out. Instead of subscribing to one hypothesis or two, I see a composite."

Modern humans' next conquest was the New World, which they reached by the Bering Land Bridge—or possibly by boat—at least 15,000 years ago. Some of the oldest unambiguous evidence of humans in the New World is human DNA extracted from coprolites—fossilized feces—found in Oregon and recently carbon dated to 14,300 years ago.

For many years paleontologists still had one gap in their story of how humans conquered the world. They had no human fossils from sub-Saharan Africa from between 15,000 and 70,000 years ago. Because the epoch of the great migration was a blank slate, they could not say for sure that the modern humans who invaded Europe were functionally identical to those who stayed behind in Africa. But one day in 1999, anthropologist Alan Morris of South Africa's University of Cape Town showed Frederick Grine, a visiting colleague from Stony Brook University, an unusual-looking skull on his bookcase. Morris told Grine that the skull had been discovered in the 1950s at Hofmeyr, in South Africa. No other bones had been found near it, and its original resting place had been befouled by river sediment. Any archaeological evidence from the site had been destroyed—the skull was a seemingly useless artifact.

But Grine noticed that the braincase was filled with a carbonate sand matrix. Using a technique unavailable in the 1950s, Grine, Morris and an Oxford University-led team of analysts measured radioactive particles in the matrix. The skull, they learned, was 36,000 years old. Comparing it with skulls from Neanderthals, early modern Europeans and contemporary humans, they discovered it had nothing in common with Neanderthal skulls and only peripheral similarities with any of today's populations. But it matched the early Europeans elegantly. The evidence was clear. Thirty-six thousand years ago, says Morris, before the world's human population differentiated into the mishmash of races and ethnicities that exist today, "We were all Africans."

A newly analyzed skull (below) links Europeans and Africans.

IRA BLOCK

There was one gap in the story: the epoch of the great migration was a blank slate.

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DC's Mayor Adrian Fenty runs regularly with friends in Rock Creek Park, a sprawling National Park in the city.
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TRUE COLORS

Call them gaudy, call them kitsch, but archaeologist Vinzenz Brinkmann insists his eye-popping reproductions of ancient Greek sculptures are right on target

BY MATTHEW GUREWITSCH

To find out what the Greek gods looked like, it would seem reasonable to start in Room 18 of the British Museum. That's the gallery devoted to the Elgin Marbles, grand trophies removed from the Parthenon in Athens between 1801 and 1805 by Thomas Bruce, seventh earl of Elgin, the British envoy to Constantinople from 1799 to 1803, when Greece was under Turkish domination. Even at the time, Elgin's action struck some as the rape of a great heritage. Lord Byron's largely autobiographical poem "Childe Harold's Pilgrimage" contains this stinging rebuke:

> *Dull is the eye that will not weep to see*
> *Thy walls defaced, thy mouldering shrines removed*
> *By British hands, which it had best behov'd*
> *To guard those relics ne'er to be restored.*

To this day, Greece continues to press claims for restitution.

The genius behind the Parthenon's sculptures was the architect and artist Phidias, of whom it was said that he alone among mortals had seen the gods as they truly are. At the Parthenon, he set out to render them in action. Fragments from the eastern gable of the temple depict the birth of Athena from the head of Zeus; those from the western gable show the contest between Athena and Poseidon for the patronage of the city. (As the city's name indicates, she won.) The heroically scaled statues were meant to be seen from a distance with ease.

The painted replica of a c. 490 B.C. archer (at the Parthenon in Athens) testifies to German archaeologist Vinzenz Brinkmann's painstaking research into the ancient sculpture's colors. The original statue came from the Temple of Aphaia on the Greek island of Aegina.

But that was thousands of years ago. By now, so much of the sculpture is battered beyond recognition, or simply missing, that it takes an advanced degree in archaeology to tease out what many of the figures were up to. Yes, the occasional element—a horse's head, a reclining youth—registers sharp and clear. But for the most part, the sculpture is frozen Beethoven: drapery, volume, mass, sheer energy exploding in stone. Though we seldom think about it, such fragments are overwhelmingly abstract, thus, quintessentially "modern." And for most of us, that's not a problem. We're modern too. We like our antiquities that way.

But we can guess that Phidias would be brokenhearted to see his sacred relics dragged so far from home, in such a fractured state. More to the point, the bare stone would look ravaged to him, even cadaverous. Listen to Helen of Troy, in the Euripides play that bears her name:

> *My life and fortunes are a monstrosity,*
> *Partly because of Hera, partly because of my beauty.*
> *If only I could shed my beauty and assume an uglier aspect*
> *The way you would wipe color off a statue.*

That last point is so unexpected, one might almost miss it: to strip a statue of its color is actually to disfigure it.

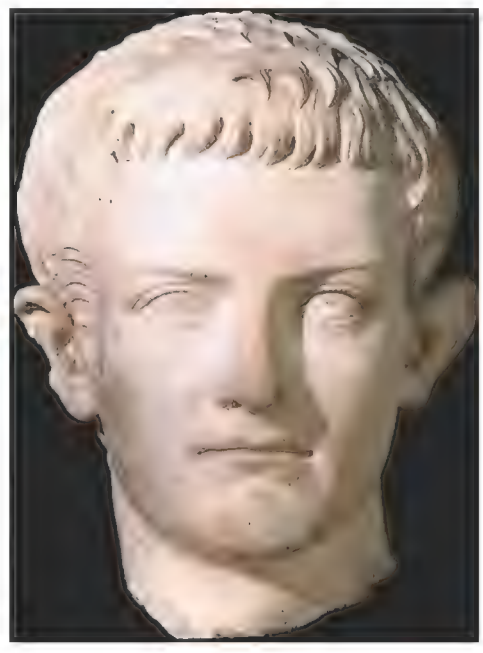
Colored statues? To us, classical antiquity means white marble. Not so to the Greeks, who thought of their gods in living color and portrayed them that way too. The temples that housed them were in color, also, like mighty stage sets. Time and weather have stripped most of the hues away. And for centuries people who should have known better pretended that color scarcely mattered.

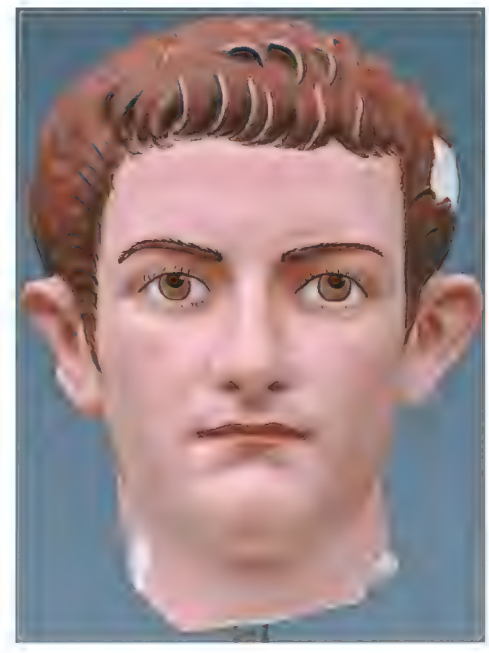
White marble has been the norm ever since the Renaissance, when classical antiquities first began to emerge from the earth. The sculpture of Trojan priest Laocoön and his two sons struggling with serpents sent, it is said, by the sea god Poseidon (discovered in 1506 in Rome and now at the Vatican Museums) is one of the greatest early finds. Knowing no better, artists in the 16th century took the bare stone at face value. Michelangelo and others emulated what they believed to be the ancient aesthetic, leaving the stone of most of their statues its natural color. Thus they helped pave the way for neo-Classicism, the lily-white style that to this day remains our paradigm for Greek art.

By the early 19th century, the systematic excavation of ancient Greek and Roman sites was bringing forth great numbers of statues, and there were scholars on hand to document the scattered traces of their multicolored surfaces. Some of these traces are still visible to the naked eye even today, though much of the remaining color faded, or disappeared entirely, once the statues were again exposed to light and air. Some of the pigment was scrubbed off by restorers whose acts, while well intentioned, were tantamount to vandalism. In the 18th century, the pioneering archaeologist and art historian Johann Joachim Winckelmann chose to view the bare stone figures as pure—if you will, Platonic—forms, all the loftier for their austerity. "The whiter the body is, the more beautiful it is as well," he wrote. "Color contributes to beauty, but it is not beauty. Color should have a minor part in the consideration of beauty, because it is not [color] but structure that constitutes its essence." Against growing evidence to the contrary, Winckelmann's view prevailed. For centuries to come, antiquarians who envisioned the statues in color were dismissed as eccentrics, and such challenges as they mounted went ignored.

No longer; German archaeologist Vinzenz Brinkmann (opposite) is on a mission. Armed with high-intensity lamps, ultraviolet light, cameras, plaster casts and jars of costly powdered minerals, he has spent the past quarter century trying to revive the peacock glory that was Greece. He has dramatized his scholarly findings by creating full-scale plaster or marble copies hand-painted in the same mineral and organic pigments used by the ancients: green from malachite, blue from azurite, yellow and ocher from arsenic compounds, red from cinnabar, black from burned bone and vine.

Koch-Brinkmann's immediate concern that day was the emperor's hair, carved in close-cropped curls, which she was painting a chocolaty brown.





The painted replica (right) of the A.D. 39-41 marble head of Caligula (left) was the product of work done by Vinzenz Brinkmann and his wife, Ulrike Koch-Brinkmann (opposite: with the original of the archer from Aegina).

Call them gaudy, call them garish, his scrupulous color reconstructions made their debut in 2003 at the Glyptothek museum in Munich, which is devoted to Greek and Roman statuary. Displayed side by side with the placid an-

STIFTUNG ARCHÄOLOGIE, MUNICH (2); PP. 66-67 STIFTUNG ARCHÄOLOGIE, MUNICH

PP. 68-69 DENIZ SAYLAN / GETTY IMAGES

tiquities of that fabled collection, the replicas shocked and dazzled those who came to see them. As *Time* magazine summed up the response, "The exhibition forces you to look at ancient sculpture in a totally new way."

"If people say, 'What kitsch,' it annoys me," Brinkmann says, "but I'm not surprised." Actually, the public took to his replicas, and invitations to show them elsewhere quickly poured in. In recent years, Brinkmann's slowly growing collection has been more or less constantly on the road—from Munich to Amsterdam, Copenhagen to Rome—jolting viewers at every turn. London's *The Guardian* reported that the show received an "enthusiastic, if bewildered" reception at the Vatican Museums. "*Il Messagero* found the exhibition 'disorientating, shocking, but often splendid.' *Corriere della Sera*'s critic felt that 'suddenly, a world we had been used to regarding as austere and reflective has been turned on its head to become as jolly as a circus.'" At the Istanbul Archaeology Museum, Brinkmann's painted reconstruction of sections of the so-called Alexander Sarcophagus (named not for the king buried in it but for his illustrious friend Alexander the Great, who is depicted in its sculpted frieze) was unveiled beside the breathtaking original; German television and print media spread the news around the globe. In Athens, top officials of the Greek government turned out for the opening when the collection went on view—and this was the ultimate honor—at the National Archaeological Museum.

Taking advantage of the occasion, Brinkmann set some of his showpieces up for photographers on the Acropolis: a brilliantly colored, exotic-looking archer, kneeling with bow and arrow; a goddess smiling an archaic smile; and, perhaps most startling of all, a warrior's gilded torso in armor that clings to the body like a wet T-shirt (p. 72). The figures may have looked wrong against the bleached, sun-drenched architecture, but they looked fine under the blazing Mediterranean sky.

An American showing was overdue. This past fall, the Arthur M. Sackler Museum at Harvard University presented virtually the entire Brinkmann canon in an exhibition called "Gods in Color: Painted Sculpture of Classical Antiquity." Selected replicas were also featured earlier this year in "The Color of Life," at the Getty Villa in Malibu, California, which surveyed polychromy from antiquity to the present. Other highlights included El Greco's paired statuettes of Epimetheus and Pandora (long misidentified as Adam and Eve) rendered in painted wood and Charles-Henri-Joseph Cordier's exotic *Jewish Woman of Algiers of 1862*, a portrait bust in onyx-marble, gold, enamel and amethyst.

The palette of these works, however, was not as eye-popping as that of Brinkmann's reproductions. His "Lion From Loutraki" (a copy of an original work dated circa 550 B.C., now in the sculpture collection of the Ny Carlsberg Glyp-

An essayist and cultural critic based in New York City, author **MATTHEW GUREWITSCH** *is a frequent contributor to these pages.*

totek in Copenhagen) displays a tawny pelt, blue mane, white teeth and red facial markings. That exotic archer (from the original at the Glyptothek in Munich) sports a mustard vest emblazoned with a pattern of red, blue and green beasts of prey. Underneath, he wears a pullover and matching leggings with a psychedelic zigzag design that spreads and tapers as if printed on Lycra. Unlike previously proposed color schemes, which were mostly speculative, Brinkmann's is based on painstaking research.

My own introduction to Brinkmann's work came about three years ago, when I was traveling in Europe and the image of a reproduction of a Greek tombstone in a German newspaper caught my eye. The deceased, Aristion, was depicted on the stone as a bearded warrior at the height of his prowess. He stood in profile, his skin tanned, his feet bare, decked out in a blue helmet, blue shinguards edged in yellow, and yellow armor over a filmy-looking white chiton with soft pleats, scalloped edges and a leafy-green border. His smiling lips were painted crimson.

Bemused by the image and intrigued by the text that accompanied it, I e-mailed the Glyptothek in Munich. Brinkmann himself replied promptly with an invitation for a private demonstration of his methodology. We met at the museum soon after.

Brinkmann led me first to a sculpture of a battle scene from the Temple of Aphaia (c. 490 B.C.) on the island of Aegina, one of the Glyptothek's prime attractions. Within the ensemble was the original sculpture of the kneeling Trojan archer whose colorfully painted replica Brinkmann had set up for the photo shoot on the Acropolis. Unlike most of the other warriors in the scene, the archer is fully

The Brinkmanns based their colorful reconstruction (far right) of the c. 530 B.C. "Peplos Kore" (right), from Athens' Acropolis, on remnants of pigment and on patterns revealed by raking and UV light (below: garment border).

dressed; his Scythian cap (a soft, close-fitting headdress with a distinctive, forward-curling crown) and his brightly patterned outfit indicate that he is Eastern. These and other details point to his identification as Paris, the Trojan (hence Eastern) prince whose abduction of Helen launched the Trojan War.

At Brinkmann's suggestion, I had come to the museum late in the day, when the light was low. His main piece of equipment was far from high tech: a hand-held spotlight. Under "extreme raking light" (the technical term for light that falls on a surface from the side at a very low angle), I could see faint incisions that are otherwise difficult or impossible to detect with the naked eye. On the vest of the archer, the spotlight revealed a geometric border that Brinkmann had reproduced in color. Elsewhere on the vest, he pointed out a diminutive beast of prey, scarcely an inch in length, endowed with the body of a jungle cat and a majestic set of wings. "Yes!" he said with delight. "A griffin!"

"It's a revolution in painting comparable to Giotto's in the frescoes of Padua," says Brinkmann of the well-preserved so-called Alexander Sarcophagus.

To view more painted reconstructions of ancient Greek sculptures, go to Smithsonian.com/sculptures

STIFTUNG ARCHÄOLOGIE, MUNICH (2); GIANNI DAGLI ORTI / ARCHAEOLOGICAL MUSEUM ISTANBUL / THE ART ARCHIVE

The surface of the sculpture was once covered in brilliant colors, but time has erased them. Oxidation and dirt have obscured or darkened any traces of pigment that still remain. Physical and chemical analyses, however, have helped Brinkmann establish the original colors with a high degree of confidence, even where the naked eye can pick out nothing distinct.

Next, Brinkman shone an ultraviolet light on the archer's divine protectress, Athena, revealing so-called "color shadows" of pigments that had long since worn away. Some pigments wear off more quickly than others, so that the underlying stone is exposed to wind and weather at different rates and thus also erodes at different rates. The seemingly blank surface lit up in a pattern of neatly overlapping scales, each decorated with a little dart—astonishing details given that only birds nesting behind the sculpture would have seen them.

A few weeks later, I visited the Brinkmann home, a short train ride from Munich. There I learned that new methods have greatly improved the making of sculptural reproductions. In the past, the process required packing a statue in plaster to create a mold, from which a copy could then be cast. But the direct application of plaster can damage precious color traces. Now, 3-D laser scanning can produce a copy without contact with the original. As it happened, Brinkmann's wife, archaeologist Ulrike Koch-Brinkmann, was just then applying color to a laser reproduction of a sculpted head of the Roman emperor Caligula.

I was immediately taken by how lifelike Caligula looked, with healthy skin tone—no easy thing to reproduce. Koch-Brinkmann's immediate concern that day was the emperor's hair, carved in close-cropped curls, which she was painting a chocolaty brown over black underpainting (for volume) with lighter color accents (to suggest movement and texture). The brown irises of the emperor's eyes were darkest at the rim, and the inky black of each pupil was made lustrous by a pinprick of white.

Such realistic detail is a far cry from the rendering of Paris the archer. In circa 490 B.C., when it was sculpted, statues were decorated in flat colors, which were applied in a paint-by-numbers fashion. But as time passed, artists taught themselves to enhance effects of light and shadow, much as Koch-Brinkmann was doing with Caligula, created some five centuries after the archer. The Brinkmanns had also discovered evidence of shading and hatching on the "Alexander Sarcophagus" (created c. 320 B.C.)—a cause for considerable excitement. "It's a revolution in painting comparable to Giotto's in the frescoes of Padua," says Brinkmann.

Brinkmann has never proposed taking a paintbrush to an original antiquity. "No," he stresses, "I don't advocate that. We're too far away. The originals are broken into too many fragments. What's preserved isn't preserved well enough." Besides, modern taste is happy with fragments and torsos. We've come a long way since the end of the 18th century, when factories would take Roman fragments and piece them together, replacing whatever was missing. Viewers at the time felt the need of a coherent image, even if it meant fusing ancient pieces that belonged to different originals. "If it were a question of retouching, that would be defensible,"

A battle scene between Persian and Greek-Macedonian warriors, carved in relief on the well-preserved, c. 320 B.C. marble "Alexander Sarcophagus" (opposite), is recast in vibrant hues in the Brinkmanns' reconstruction (below). Traces of pigment provided clues to the original colors.

STIFTUNG ARCHÄOLOGIE, MUNICH (2)

Where color choices remain speculative, Brinkmann provides alternate replicas of a statue (left: the "Cuirass-Torso," found at the Acropolis in Athens) to illustrate different interpretations (center and right).

Brinkmann says, "but as archaeological objects, ancient statues are sacrosanct."

A turning point in conservation came in 1815 when Lord Elgin approached Antonio Canova, the foremost neo-Classical sculptor, about restoring the Parthenon statues. "They were the work of the ablest artist the world has even seen," Canova replied. "It would be sacrilege for me, or any man, to touch them with a chisel." Canova's stance lent prestige to the aesthetic of the found object; one more reason to let the question of color slide.

In the introduction to the catalog of the Harvard show, Brinkmann confesses that even he is a relatively recent convert to the idea that the painting of statues actually constituted an art form. "What that means," he elaborates, "is that my perspective has been molded by 20th-century classicism. You can't shake that off. It stays with you all your life. Ask a psychiatrist. You have to work very hard to adjust to a new way of seeing. But I'm talking about personal feelings here, not about scholarly conviction."

"Vitality is what the Greeks were after, that, and the charge of the erotic. . . . Dressing this torso and giving it color was a way to make the body sexier."

Past attempts to colorize, notably by Victorian artists, were based mostly on fantasy and personal taste. Sir Lawrence Alma-Tadema's painting *Pheidias and the Frieze of the Parthenon* (1868-69) shows the Greek artist giving Pericles and other privileged Athenians a private tour of the Parthenon sculptures, which are rendered in thick, creamy colors. John Gibson's life-size statue *Tinted Venus* (1851-56) has honey hair and rose lips. One 19th-century reviewer dismissed it as "a naked impudent English woman"—a judgment viewers today are unlikely to share, given the discreet, low-key tints Gibson applied to the marble. In the United States, C. Paul Jennewein's king-size allegorical frieze of sacred and profane love on a pediment of the Philadelphia Museum of Art, unveiled in 1933, is more lavish in its use of color. The figures, representing Zeus, Demeter and other Greek divinities, are executed in showy glazed terra cotta. To contemporary eyes, the effect appears Art Deco, and rather camp.

While viewers today may regard Brinkmann's reconstructions in the same light, his sculptures are intended as sober study objects. Areas where he has found no evidence of original coloration are generally left white. Where specific color choices are speculative, contrasting color re-creations of the same statue are made to illustrate the existing evidence and how it has been interpreted. For example, in one version of the so-called Cuirass-Torso from the Acropolis in Athens (the one in which the armor appears to cling like a wet T-shirt, above), the armor is gold; in another it is yellow. Both are based on well-founded guesses. "Vitality is what the Greeks were after," Brinkmann says, "that, and the charge of the erotic. They always found ways to emphasize the power and beauty of the naked body. Dressing this torso and giving it color was a way to make the body sexier."

But the question remains: How close can science come to reproducing the art of a vanished age? There is no definitive answer. Years ago, a first generation of inquisitive musicians started experimenting with early instruments, playing at low tunings on gut strings or natural horns, hoping to restore the true sound of the Baroque. Whatever the curiosity or informational value of the performances, there were discriminating listeners who thought them mere exercises in pedantry. When the next generation came along, period practice was becoming second nature. Musicians used their imagination as well as the rule books and began making music.

Brinkmann ponders the implications. "We're working very hard," he says. "Our first obligation is to get everything right. What do you think? Do you think some day we can start making music?"

STIFTUNG ARCHÄOLOGIE, MUNICH (3)

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Set like a jewel on the edge of Lake Como, the city of Como (its shoreline at dusk) is not just a tourist mecca but also an important center of the country's silk industry, providing high-quality goods to the fashion houses of New York City, Paris and Milan.

The Italian city of Como, celebrated for its silk and scenery, has inspired notables from Leonardo da Vinci and Giuseppe Verdi to Winston Churchill and George Clooney

BY PETER ROSS RANGE

Silken Treasure

"The silkworm is a snob," says Moritz Mantero. "He'll eat anything, but he produces silk only if he eats mulberry!" Mantero is the third-generation owner of Mantero Seta SpA, one of the largest silk manufacturers in Como, Italy. Situated three miles from the Swiss border in northern Italy's lake country, Como supplies silken goods to the fashion houses of New York City, Paris and nearby Milan. Although the backbreaking labor of cultivating the voracious and picky silkworms left Italy after World War II—returning to China, whence it had come centuries earlier—the finishing end of silk production stayed here and expanded. Today in Como and its surrounding foothills, there are 800 companies engaged in the silk and textile trade—manufacturing, printing, dyeing, designing, selling. And more than 23,000 Comaschi, as Como residents are called, work in the business. In 2007 they turned out some 4,400 tons of silk fabric. If you own a silk scarf, tie, blouse or dress by any big-name fashion house, from Armani to Zara, chances are the silk came from Como.

The city, which is also the tourist hub of Lake Como, one of Europe's deepest and most picturesque lakes, is to luxury silk what Reims is to Champagne and Modena to fancy sports cars. Since the manufacturing of silk for the mass-market end of the rag trade migrated largely to China in the past two decades, Como has con-

PHOTOGRAPHS BY SCOTT S. WARREN

centrated on the high-end market, which means fast turnaround for two or three collections a year, sometimes even including final delivery directly to the boutiques of a client like Chanel. "That's the total service they expect," says Mantero of such world-famous designers as Versace, Prada and Ralph Lauren. China, he says, is too far away and too slow to meet the fast-changing demands and relatively small orders of luxury fashion houses.

"Service is not just a practical matter, it's a matter of culture," says Guido Tettamanti, secretary of the Italian Silk Association. "The Como suppliers speak the language of the fashion houses. It's not just the client who proposes. Como also proposes."

Como became Italy's silk capital for two reasons, silk makers say. First, there was an ample supply of water from the lake and nearby alpine streams to the north. Second, there was widespread mulberry farming in the Po River Valley just to the south. Mulberry, native to Italy, was often planted as a field and property divider. This made the region a natural for the cultivation of silkworms.

For me, there's a third reason: the town's physical setting—a palm-lined fjord with an improbable Mediterranean climate and snowy ridgelines in the near distance—may be unmatched in the world. Even its man-made attractions, especially the grand 16th- to 19th-century villas that dot its shores, suggest that adding to the sum of beauty on earth is what is supposed to happen here. And it does—in the silk, in the architecture and in the lifestyles. "We call it *la cultura del bello*," says Tettamanti. "The culture of beauty."

That culture was on full display as I set out to explore the city and its lakefront one sparkling fall day. The water glinted between sharp Swiss peaks on one side and rolling Lombard hills on the other. Ferries and fishermen skittered across the lake's surface like bugs on the hunt. Small seaplanes buzzed in and out of the Aero Club at the water's edge. Stone structures and ocher facades lined the city's streets, which hummed with the energy of Italian life. A market was selling regional sausages, cheeses and olive oil; mimes and accordionists entertained on the Piazza Duomo; and families bought gelati from a kiosk in a lakeside park next to the Volta Temple, a museum-cum-memorial to Alessandro Volta, a local aristocrat and

"Everything we do starts by hand," says silk company owner Moritz Mantero (above left: between two of his designers). Donatella Ratti (above: at her headquarters) runs the Ratti Group. "Creativity and high quality," she says, "that's our way to survive."

physicist who in 1800 invented the voltaic pile, an early electric battery.

In Como's lively pedestrian zone—within the old walled Roman city founded when Julius Caesar sent 5,000 men to colonize the place 2,000 years ago—young couples with strollers greeted other young parents on the flagstone-paved streets. Exuberant youngsters chased pigeons and darted around on bicycles, while teenage rakes chatted up chic young women in sidewalk cafés.

Reminders of silk were everywhere. Along Via Vittorio Emanuele II, the main shopping street, designer boutiques splashed silken wares in their windows. On the Piazza Cavour, the main square opposite the town's ferry port, a large emporium offered a profusion of silk products. And just outside the city walls, La Tessitura, a store opened by Mantero in a former textile mill, featured a restaurant called the Loom Café.

Both the city and lake of Como have been drawing visitors for centuries. Many who came were wealthy, which is reflected in the exceptional concentration of villas—palaces, really—that line the inverted Y-shaped lake. Arrayed against rising dark hills, the villas look like set pieces for a movie backdrop. (Indeed, many movies—including *Casino Royale*, *Star Wars: Episode II Attack of the Clones* and *A Month by the Lake*—have been filmed here.)

Notables, too, have been coming since Roman times. Both Plinys, Elder and Younger, were born here and Pliny the

MAP: GUILBERT GATES

Spin Cycle

Silkworm farming, or sericulture, was a backbreaking job that often required the participation of entire families

SILKWORMS WERE FIRST brought from Asia to Byzantium around A.D. 550. Legend has it that two monks hid silkworm eggs inside a bamboo pole to smuggle them out of China, where they were guarded as closely as state secrets. The monks then presented the eggs to Byzantine Emperor Justinian I in Constantinople, where he created a thriving silk industry. Silkworms reached Italy through Sicily in the 12th century, and by the 13th century, silkworm cultivation—or sericulture—had migrated north to the Po River Valley. By the 16th century, sericulture had been introduced to the Como area.

The arduous task of silkworm cultivation involved keeping the tiny silkworm eggs (about 35,000 of them weigh only an ounce) at the correct temperature. Hatched worms then had to be fed mulberry leaves around the clock (above).

Silkworm farming was a brutal job. Since silkworms require a constant, mild temperature, entire sections of farmhouses were turned over to them and whole families would often pitch in, stoking round-the-clock fires to maintain the proper warmth. Some even "gave the worms the house and slept outside in the stalls with the animals," says Ester Geraci, an official at Como's Educational Silk Museum.

The process began with the 10- to 14-day incubation of silkworm eggs, which are produced by the mating of adult silkworm moths. According to the Silk Museum, keeping the tiny, delicate eggs (about the size of a pinhead) at just the right temperature was "the task of the women, who often carried small bags of eggs in direct contact with their skin . . . sometimes between their breasts." Once hatched, the worms, only about one millimeter long, had to be fed mulberry leaves night and day. From a birth weight of only half a milligram, they would grow 10,000-fold to a final weight of around five grams and a length of 8 to 9 centimeters (3 inches) in just 30 to 32 days. Then, in the final three days of their larval stage, the worms would start to spin their cocoons out of one continuous thin filament—up to 1,200 meters (or 4,000 feet) long—which they emitted from a "spinneret" located near their mouths. The filament, formed primarily of a substance called fibroin manufactured in two glands on the underside of their jaws, hardened instantly when it came in contact with the air.

After about a week, the cocoons were placed briefly in a hot, dry oven to kill the adult moths inside. (If allowed to emerge from a cocoon, an adult moth would ruin the silk, so just enough adult moths were allowed to fully mature to maintain the reproduction cycle.) The cocoons were then put in hot water to facilitate the difficult and tedious task of extracting the silk. The minute end of the cocoon's silk filament had to be located and threaded onto a reel, which then unwound it from the water-warmed cocoon. The silk thread was then cleaned, twisted (to prevent filaments from separating) and woven into fabric.

Como's silk companies now buy most of their undyed raw silk (both fabric and yarn) from China. P.R.R.

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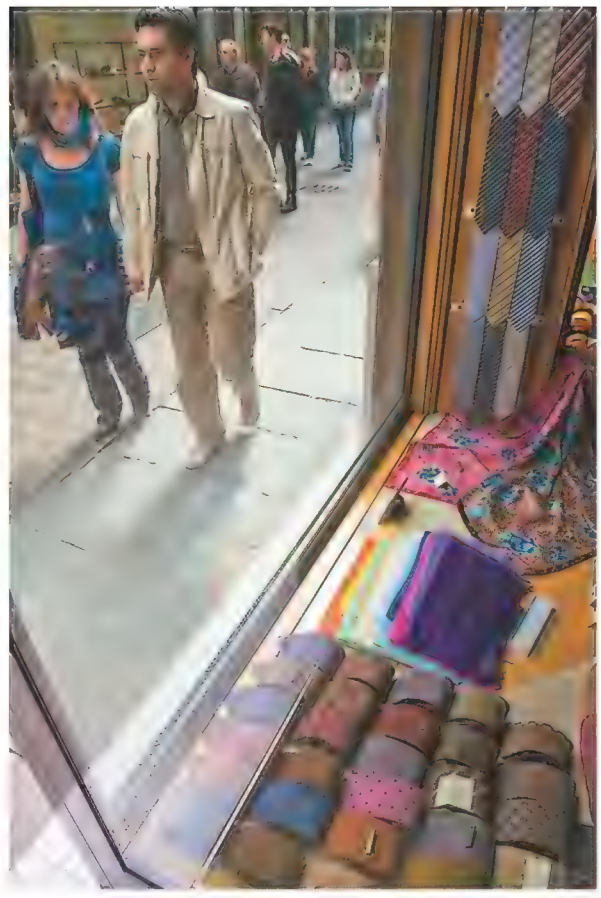

Reminders of silk are everywhere—from concept (far left, top: a designer at work at Mantero Seta; bottom: vats of dye in Ratti's "color kitchen") to end product (left: a store on Como's main shopping street).

Younger built two country houses along the lake—one named Tragedy, the other Comedy. Leonardo da Vinci visited and was said to incorporate scenic elements from the area in some of his canvases. In 1568, Cardinal Tolomeo Gallio constructed what is probably the most famous building on the lake, now known as the Villa d'Este. The Renaissance-style palace, originally built right on the water's edge in the town of Cernobbio, was designed by a leading architect of the day. In 1815 the building passed into the hands of German Princess Caroline of Brunswick, the estranged wife of George IV, Prince of Wales. Caroline spent the next five years upgrading the house—adding a library and a theater and expanding the terraced hillside gardens—and putting on gala parties. In 1873 the estate became a hotel, eventually hosting such boldface names as Frank Sinatra and Ava Gardner, the Duke and Duchess of Windsor, Alfred Hitchcock and Mikhail Gorbachev. Today's guests—who pay $1,000 and up per night for accommodations—include movie stars, Russian oil magnates and American business leaders.

In the 19th century, a parade of writers—Stendhal, Wordsworth and Shelley among them—spread the word of Lake Como's charms. "I ask myself, Is this a dream? / Will it vanish into air? / Is there a land of such supreme and perfect beauty anywhere?" Longfellow wrote of the lake. Liszt, Bellini and Verdi composed music on its shores. After World War II, it was a destination of choice for both Winston Churchill, who painted from a villa in the village of Moltrasio, and Konrad Adenauer, the first postwar German chancellor, who summered in Menaggio.

Today a new generation of famous visitors is descending on Lake Como. The best known is the actor George Clooney, who in recent years has purchased two villas in Laglia, a lakeside village six miles north of Como. "People sometimes call us Lake Clooney," says Jean Govoni Salvadore, the longtime public relations director at the Villa d'Este. Others have apparently started calling Laglia, formerly a sleepy stop on the lake's ferry route, "Georgetown." At least that's what I was told by Sergio Tramalloni, a member of Como's very active seaplane club, as he flew me over the lake and pointed out Clooney's property.

Clooney's presence has reportedly attracted a stream of other celebrity visitors and would-be villa owners. Last year, *Vanity Fair* cited Italian newspaper reports that Tom Cruise, Bill Gates, Richard Branson and recently re-elected Italian Prime Minister Silvio Berlusconi had all either purchased or were shopping for Lake Como villas. The Comaschi watch all this with mixed feelings. They are happy to see fresh money reviving hotels and restoring stately properties. But they also know that gentrification and the influx of celebrities come at the cost of increased traffic and, now, dramatically inflated real estate prices.

Actor George Clooney owns two lakeside houses. His villa Oleandra is at front left.

While the arrival of Clooney and friends may have captured Como's headlines, silk makers and fashion houses still shape its spirit. Mantero, dapper in a pale-blue spread-collar shirt and handmade silk tie, leads me through the design ateliers and consulting rooms of his company's headquarters—a stately urban villa with dark wainscoting, broad hallways

and coffered ceilings. In what looks like a professor's study, four people lean over a stack of large design albums. "That's Ferragamo on one side and our designers on the other," Mantero whispers. "They're planning some new scarves."

We walk across a glassed-in bridge from the villa to the design ateliers, where another team is gathered around a long table. This group is finalizing a design for dress material. In the main atelier—a huge room with light streaming in through high windows—I see a dozen or more designers working with pencil, pen, brush and computers. "All these people are artists," says Mantero. "Everything we do starts by hand. It would be far cheaper to do it all by computer, but that's not what our clients want. They want to know that every design is hand-done."

A woman named Donatella (she shyly declines to give her last name) painstakingly draws tiny butterflies, mosquitoes and whimsical flowers for a blue-and-gray scarf design ordered by Liberty of London. At another table, designer Mauro Landoni scans Donatella's drawings into a computer, creating files that will ultimately produce the porous screens that are used for printing on silk. Each will allow a single color to pass through onto bolts of off-white silk stretched out on printing tables that are nearly the length of a football field. The design of a single scarf may need as many as 30 to 35 screens. Landoni's computer scans will also create stencils for weaving dyed silk yarns into a desired design.

A few days after my tour of Mantero's operations, Donatella Ratti, president of the Ratti Group, the other best-known silk company in the Como area, takes me on a tour of her offices. Situated on a plateau about 12 miles from Como with an unobstructed view of the Lombardy Alps, the headquarters houses administrative, sales and design teams in a single, 50,000-square-foot room. "We put women's scarf designers near the home furnishings people," says Ratti, "so

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Former Time *foreign correspondent* **PETER ROSS RANGE** *writes about travel and international affairs. Photographer* **SCOTT S. WARREN** *is based in Durango, Colorado.*

View more of Scott Warren's photos of Lake Como at Smithsonian.com/como

Como's Piazza Duomo (above left) is a popular gathering spot for both tourists and locals. The town of Bellagio (above) is on a promontory at the junction of the lake's two arms. Noted for its silk shops as well as its idyllic setting, it's about a 40-minute hydrofoil jaunt from Como.

each knows what the other is doing."

Style consultant Fabio Belotti, whose wild white hair makes me think of Albert Einstein, tosses silk swatches and design books around as he explains how he and his staff work with the fashion houses to find a winning look for the next collection. "Today we have to be very fast," he says. "In the United States they all do eight collections a year. We try to find something we love, but sometimes the client wants something else, so we collaborate with them."

Touring Ratti's printing plant, I'm amazed by the complexity of the process: the thousands of dye variations in what is called the "color kitchen," the ceiling-high racks of hundreds of silk screens, the baskets full of hanks of raw silk from China and the creative interchange between the print technicians and the designers. At one long table, a man was doing something I'd never before seen in previous visits to silk country: painting, not just printing, a long bolt of silk. Renato Molteni, who refuses to call himself an artist, was making art. Dipping a spatula—"they want the spatula look," he told me—into his dye buckets, he was creating, over and over again, an array of flowers on a large swath of silk. The diaphanous design—beige on white, with tinges of gray—was for dress material ordered by the Milanese fashion house of Dolce & Gabbana. One can only imagine what those dresses are going to cost. Molteni says simply, "You have to watch out that the flowers don't get too big."

"Creativity and high quality, that's our way to survive," says Ratti. "The Chinese are good at doing big quantities. They are not interested in making luxury. It's difficult, it's hard, it's expensive. They can't understand why we would print only 100 meters of something. But there are new rich people in the world—in China, in India, in Russia. They want luxury. They want real Ferraris, real Rolexes, real Hermès. They want Europe."

Wonders and Whoppers

Following in Marco Polo's footsteps through Asia leads our intrepid author to some surprising conclusions **BY MIKE EDWARDS**

"I **TELL YOU,"** wrote Marco Polo, "that this palace is of . . . unmeasured wealth." Its roof is sheathed in gold "in such a way as we cover our house with lead." Even the floors are gold, "more indeed than two fingers thick. And all the other parts of the palace and the halls and windows are likewise adorned with gold." In this gilded domain, he declared, lived the ruler of an island kingdom called Cipangu (that is, Japan), whose waters yielded red pearls "very beautiful and round and large."

Scholars believe Europeans had never heard of Cipangu before Polo told them about it in *The Description of the World*, which he started writing about 1298, a few years after he returned home to Venice from a 24-year Asian odyssey. Though fascinated, Polo's readers, according to one account, concluded that his tales were "fabulous . . . mere dreams." But as decades passed, some began to take Polo seriously. In Christopher Columbus' copy of *The Description*, which survives, "gold in the greatest abundance" and "red pearls" are written in the margin beside the Cipangu reports. Although the handwriting may not be Columbus', he is said to have sought Cipangu among the Caribbean isles on his 1492 voyage.

Columbus never came anywhere near Japan, of course, but what would he have found? Red pearls? Experts say the oysters that produce them don't inhabit Japanese waters. A golden palace? Japan's Golden Pavilion, the gold-leaf-covered Kinkakuji, was built in

Polo (top) wrote of men with dogs' features (a French illustration, c. 1412), among several other fantastic creatures.

ALAMY; BIBLIOTHÈQUE NATIONALE / AKG IMAGES

1397, a century after Polo published.

Truth to tell, many of Marco Polo's tales of treasure were just that—tales. *Tall* tales. Readers who persevere in Polo's often confusing, disjointed text will encounter preposterous supernatural events and an astonishing bestiary, including men with the features of dogs. Some readers have even concluded that the book is a total fake. If Marco Polo went to China, British Sinologist Frances Wood asked some years ago in a book titled, appropriately enough, *Did Marco Polo Go to China?*, why did he fail to mention chopsticks, tea and the binding of girls' feet?

At the British Library, where Wood curates the Chinese collections, the switchboard lit up with calls from journalists and scholars. After all, Polo's book has ornamented libraries the world over for centuries and is regarded, despite its flaws, as one of the world's greatest travel accounts. Wood had taken on a global icon. "I knew that Marco Polo was a household name," she told an interviewer, "but I was unaware that millions of people all over the world felt passionately about him and would be baying for blood."

Polo's fellow Italians have long assumed that he was a fibber; both he and his text are known in his homeland by the name *Il Milione*, and many think it's because the book includes a million tall tales. But didn't Polo enrich Italy by bringing home pasta and ice cream? Nope, those are myths. Still, Italians weren't about to tolerate a challenge to Polo's integrity by a foreigner, and many other people in the world are likewise invested in him. In China, historians staunchly defend the man who helped put their country on the map.

ABOUT TEN YEARS AGO, as a staff writer for *National Geographic*, I followed Polo's journeys across Asia, from Iraq to China and homeward via Sumatra, India and Sri Lanka, using his book as my guide. (There are about 120 versions of his narrative; the one I carried, generally considered the most authentic, is translated from a 14th-century copy in the French National Library.)

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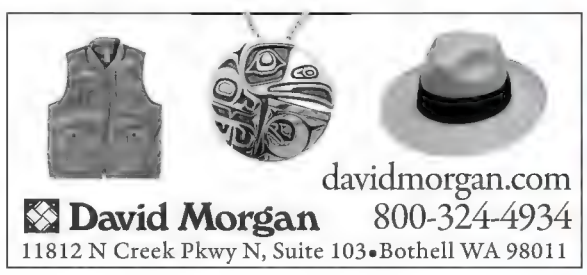

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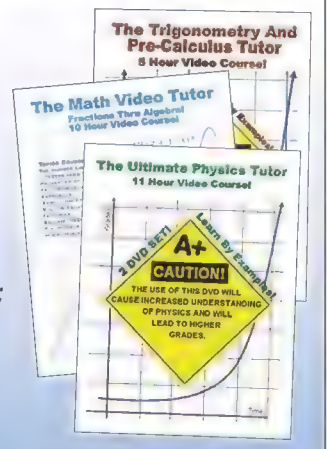
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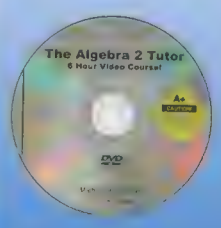

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Kublai Khan's Beijing palace (in a 15th-century illustration) was "the greatest that ever was seen," Polo wrote. But scholars believe Polo exaggerated the ruler's wealth.

Like others who have examined his writings closely, I am dismayed by his omissions and floored by his whoppers. But I am ultimately convinced of his essential truthfulness. Why? For one thing, his itineraries, as laid out by the sequence of book chapters, are fundamentally accurate, whether he's crossing Central Asia or central China. Where did he acquire that geographical information if he didn't make these journeys himself? No skeptical investigator has ever proved that he copied from some Arab or Chinese source. And while it's true that Polo is guilty of curious omissions (those chopsticks, for example), he expanded medieval Europe's meager knowledge of Asia with such hitherto-unknown names as Cipangu, Java, Zanzibar and Ceylon (Sri Lanka), besides identifying China's great cities and describing such features as the Takla Makan Desert and the Yangtze River. Having followed Polo's tracks, I know firsthand that he also got many things right, such as: both lapis lazuli and rubies are found in the Badakhshan region of Afghanistan; in China's southwest a minority people eat raw flesh; people in Sumatra and Sri Lanka make a joy juice from fermented palm tree sap.

Polo also produced an extensive report on Hindu customs in India, a country that clearly fascinated him. But his great love was Catai, as he called China. No kingdom ever had a better PR person. Time and again Polo wrote of Catai's wealth in silk and spices (no exaggeration) and declared that people had "all things in great abundance." So far, so good. But soon he was claiming that Hangzhou had 12,000 bridges arcing over its canals, a ludicrous inflation, even though Hangzhou was the world's largest city at the time; he even accorded the much smaller Suzhou 6,000 bridges. "Take that, Venice!" he seemed to be saying to his canal-rich hometown. (A later traveler could find only 347 bridges in Hangzhou, including those in its suburbs, and just 290 in Suzhou.)

Polo practically bubbled with enthusiasm as he described the palace of Kublai Khan, the Mongol ruler of Catai, in what is today Beijing. (He called the capital Cambaluc, a corruption of its Turkish name, Khanbalikh, "Khan's city.") The palace was "the greatest that ever was seen," with a hall large enough to accommodate 6,000 diners, and was encompassed by a wall four miles around. In some versions of his book, the wall grew even longer, in one case to 32 miles. Mangling his claims according to their own whims, *The Description*'s translators, scribes and finally printers (beginning in 1477) often took his inconstant veracity down a further peg or two.

Whenever Polo mentioned Kublai, he laid it on thick. His hunting retinue,

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we are told, included 20,000 dog handlers; 10,000 falconers carrying gyrfalcons, peregrines, saker falcons and goshawks (Polo showed himself to be an avid birder); and unstated numbers of lions, leopards and lynxes to go after wild boars and other big animals. Still extolling his overlord—he claimed to have been a trusted servant of Kublai's regime—Polo wrote that the new year was celebrated in Cambaluc with a parade of Kublai's elephants, "which are quite five thousand, all covered with beautiful cloths," and with gifts to the ruler of "more than 100,000 white horses very beautiful and fine."

It's true that Mongol lords reveled in the royal hunt, a huge spectacle, and that they celebrated holidays grandly. And no doubt Kublai, like many Asian potentates, kept stables of elephants as a mark of power—but nothing like 5,000. And historians are confident that he didn't hunt with any 20,000 dog handlers or 10,000 falconers. "The numbers are staggering—they're obviously exaggerated," says Professor Morris Rossabi of the City University of New York, author of the definitive study of Kublai's reign. It is difficult to imagine his people maintaining, for example, a royal herd of 100,000 steeds in the region of Beijing. "People in the north didn't grow enough food to sustain themselves," Rossabi says. "Most of it had to be brought from the south. I can't believe they devoted tremendous amounts of pastureland to having 100,000 horses." Some scribes who copied Polo's text shrank the elephant herd to 500 or omitted it altogether, probably smelling excess, while one version raised it to 105,000.

Still, Polo had plenty of authentic marvels with which to astonish his countrymen—black stones that burned better than wood; money made of paper, porcelain, asbestos; huge oceangoing ships. And he documented China's wealth in silk and spices as well as its commerce with India, Java and other parts of Asia—valuable information for a trading state like Venice.

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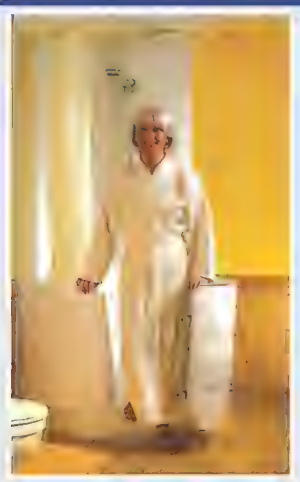

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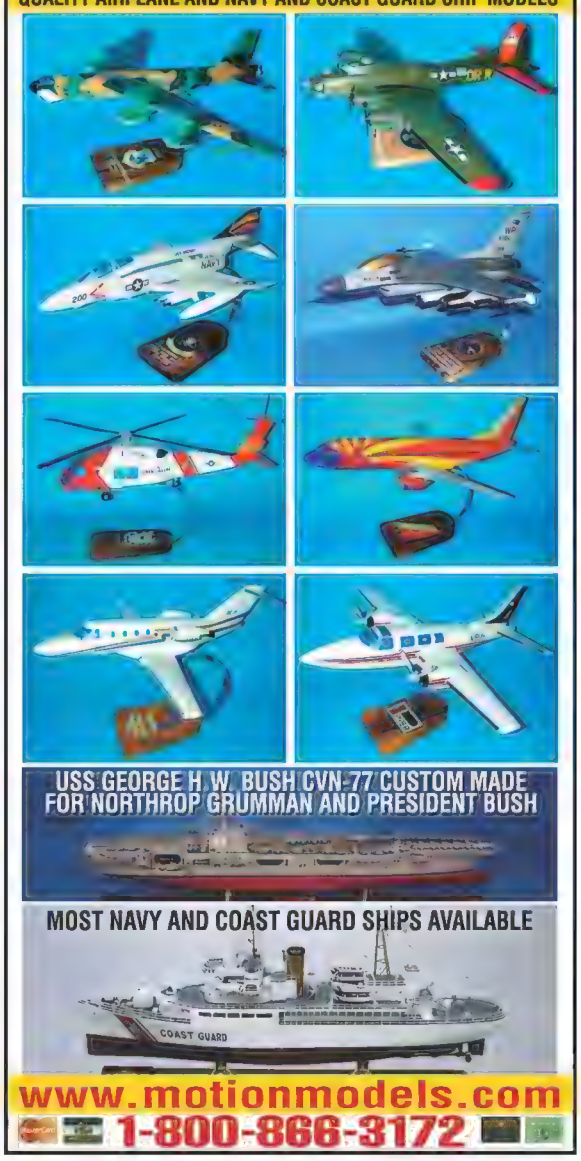
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Commingled with Polo's clearly tall tales are credible accounts of Asian goods (above: Chinese pearls and turquoise).

never know for sure, but exaggeration is sometimes a character defect in adventurers—Walter Raleigh's gold-strewn El Dorado comes to mind. And in 13th-century Europe, even outright lies were a literary conceit. Grotesque beasts and magical doings were routine in the modest libraries available to even the most educated Europeans. *The Histories* of Herodotus, for example, told of gold-digging ants in India and winged snakes in Egypt.

I BELIEVE POLO kept a journal during his travels; if not, how did he manage, when at last home in Venice, to set down the wealth of detail that he had accumulated during his two dozen years of travel? Polo's diary: what a sensational discovery that would be! He doesn't say he kept one, but a version of *The Description* that appeared in Venice in the 1500s, supposedly based on authentic manuscripts, declares that he brought home "writings and memoranda." And these, it is said, were shared with a writer who helped him produce his book. That person is identified at the beginning of the text as Rustichello of Pisa, who'd been reworking some of the romantic stories of King Arthur, and whose writings had found their way into European

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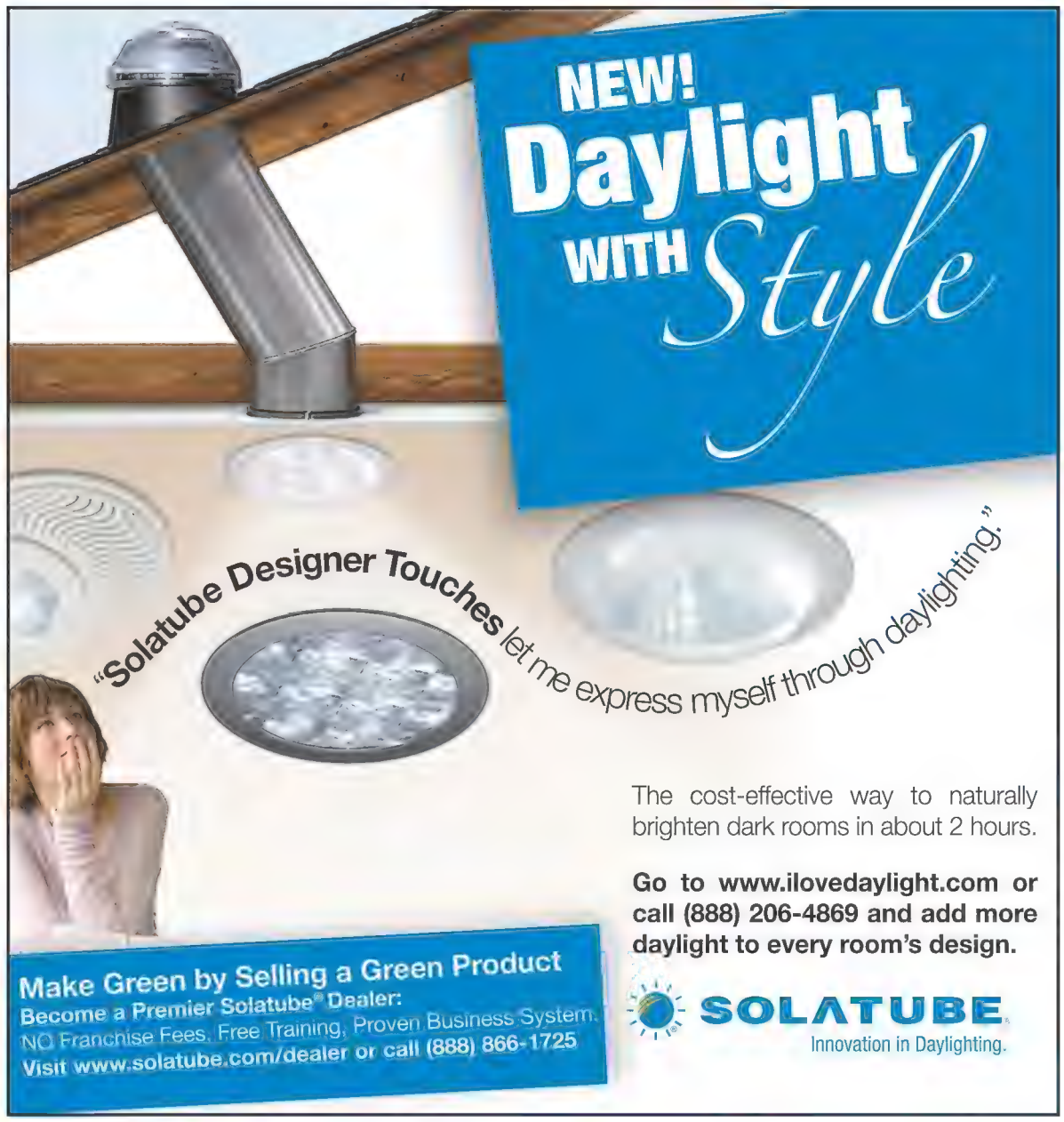
libraries. According to Polo, he met Rustichello in a Genoa prison, into which Polo had been thrown after being captured in a sea battle between Venice and rival Genoa about 1298. Sounds like another tall Polo tale, but so far as scholars know, it's true.

Scholars see the hand of Rustichello in the book's account of a battle between Genghis Khan and Prester John, a Christian ruler in Asia, early in the 13th century. With its huge loss of life—although no body count was recorded—the engagement made a good story. Too bad there was no such person as Prester John; as historians know today, he was entirely a European invention. The legend was no doubt well known to Rustichello, while less so to Polo.

I also suspect Rustichello of concocting the tale of robbers able to "make the whole day become dark" as they swept down upon travelers. Polo described such an attack on his caravan in the desert of Iran. The passage continues, suspiciously, in the third person: "Moreover I tell you that Master Marc himself was as good as taken by that people in that darkness."

Then there are the mangonels, or catapults, Polo writes about. According to the author, Polo, his father and uncle helped build huge rock-hurling machines that inflicted terrible damage on the city of Xiangyang as Kublai pressed his conquest of the southern Chinese dynasty, the Song. Chinese as well as Persian sources describe the destruction, but credit Syrians employed in Kublai's army for the catapults. In any case, the siege occurred in 1273, and almost all authorities believe the Polos didn't reach China until two years later. Polo probably heard of the siege and took note of it. It may be that Rustichello, always attracted to stories of battle, came across it somewhere in his reading and decided to make the Polos military engineers.

Starting home by ship in 1291 or 1292, Polo was forced to spend five months on "Java the Less"—Sumatra—waiting for monsoon winds to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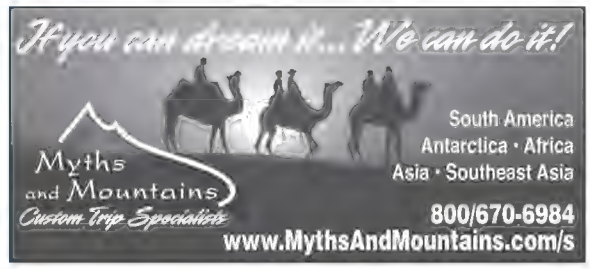

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shift so that he and his shipmates could sail northwestward toward Ceylon and India. Polo reported, accurately, that cannibals dwelled on Sumatra and, less accurately, that the island was home to some strange beasts, including enormous unicorns, in size "not at all by any means less than an elephant."

"I tell you quite truly," Polo continued about Sumatra, "that there are men who have tails more than a palm in size." And on an island that he called Angaman—probably referring to the Andaman Islands in the Bay of Bengal—"all the men . . . have the crown of the head like a dog and teeth and eyes like dogs." Tales of strange creatures abounded in Asia as well, and Polo (who apparently never set foot on the Andamans) may have heard about them from sailors. It's also possible that he—or Rustichello—simply drew on the elaborate mythical bestiary of Europe's Middle Ages. (Or perhaps, as John Larner argues in *Marco Polo and the Discovery of the World*, Polo was simply describing the islanders metaphorically.)

Even as he served up these wild reports, Polo methodically cataloged a South Asian cornucopia, about which Europe knew almost nothing: the nutmeg and aromatic roots of Java, the camphor and coconuts of Sumatra, the pearls, diamonds and pepper of India, ivory from several places—these and many other goods, all tantalizing to European merchants, were commingled with the beasts and fantasies. It's as if the world, as Europeans viewed it, were a mix of real and unreal.

Some readers took notice of things "which are reckoned past all credence," as a Dominican friar recorded. When Polo was dying, in 1324, friends urged him to remove "everything that went beyond the facts," presumably to cleanse his soul.

Polo refused, saying he had not written half of what he had seen. He might have added: "And only half of what Rustichello and I invented."

MIKE EDWARDS *covered 6,000 miles in Marco Polo's footsteps.*

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Theoretical physics has been hopelessly stalled for over 30 years. Moribund. Ossified. The Standard Model of particle physics uses over 20 ad hoc constants, and no one knows why they are necessary or why they have the values they do. Quantum physics and general relativity remain utterly incompatible. Cosmologists haven't the foggiest idea what could have caused the Big Bang or what, if anything, came before it. And finally, after over 30 years of effort, string theory hasn't even achieved the status of *science*.

There is a very simple reason for this catastrophic, intractable mess. Theorists stopped asking *why* a long time ago. Without the *why*, the search for mathematical symmetries becomes numerology, not science. No telescope or particle accelerator, regardless of its size, is going to tell us *why* the universe is the way it is. When the *why*'s remain unanswered, there is no understanding. When there is no understanding, there is no progress. But this sad situation is about to change forever.

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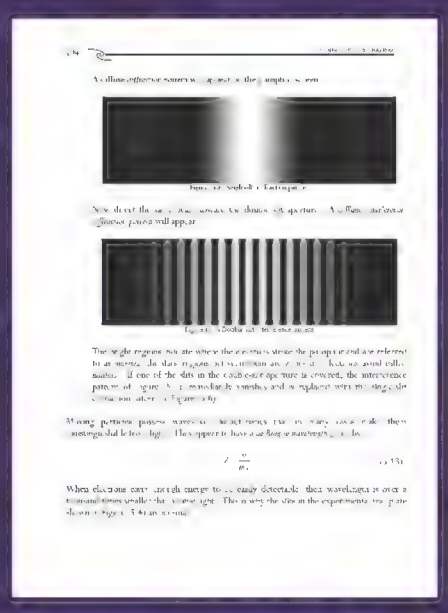

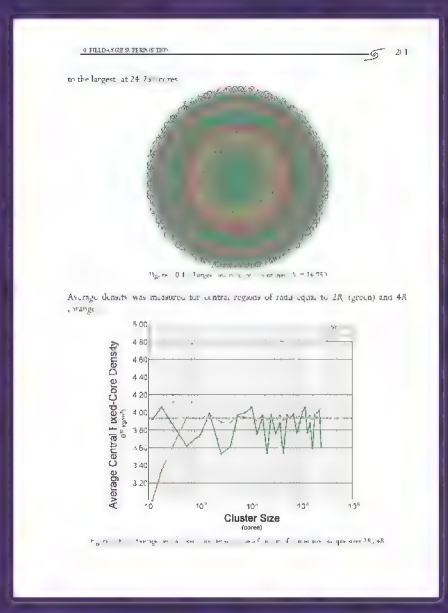

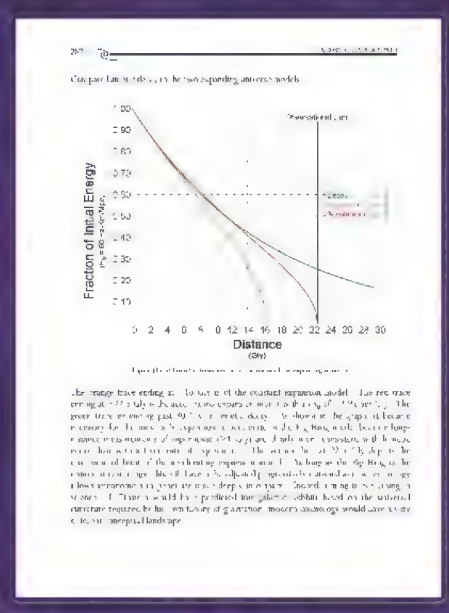

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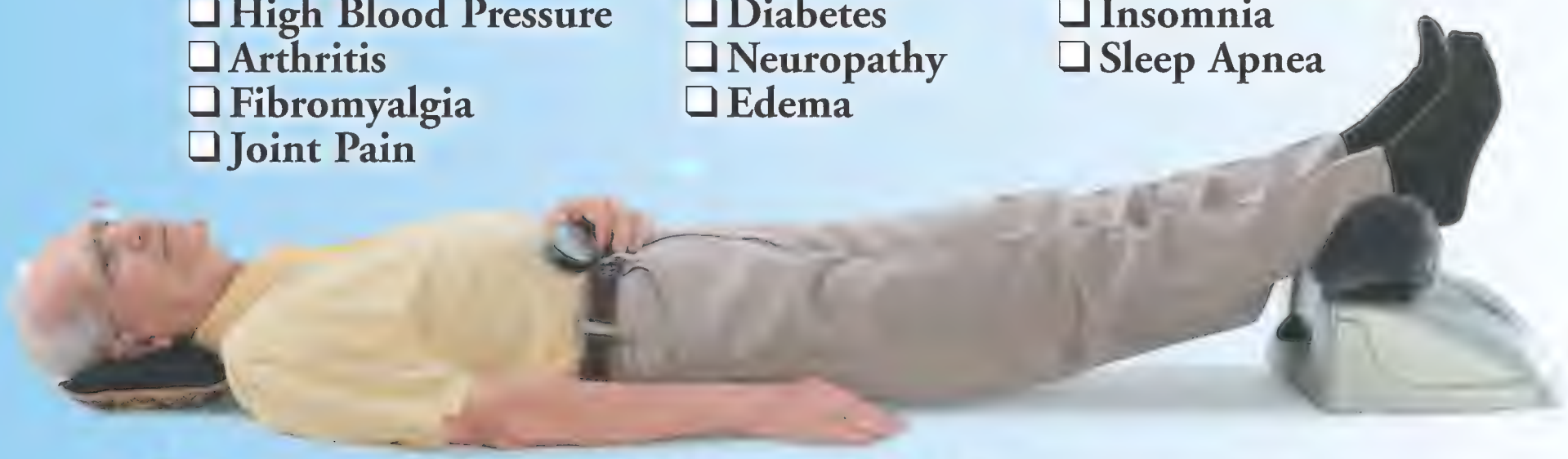

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How Does the Exerciser 2000 Elite™ Work?

Enjoy the benefits of passive exercise—just lie down, place your ankles on the ankle rest and let the machine do the work.

When you turn the machine on, it creates a 2 inch, right to left movement that gently moves the body back and forth.

This gentle swinging motion cycles up through the whole body, creating an exercise movement without stress or impact on the joints.

Don't be fooled by cheap imitations

Features

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- Heavy duty, high torque DC motor
- Wide cushioned ankle rest
- 16 minute digital timer with safety shut-off
- **2 year parts and labor warranty**

What people are saying about the Exerciser 2000 Elite™

After using the Exerciser 2000 Elite™ twice a day for one week the swelling in my ankles went away. It has also helped my breathing, as I can get out and walk without having to stop and catch my breath! Thank you. —*Shirley H., Florida*

After having a stroke, I could no longer exercise the way I used to. As a result, I developed edema. A friend of mine introduced me to the Exerciser 2000 Elite™. I loved it and I purchased one for myself. After using the machine daily for a few weeks, my symptoms of edema were completely gone. I now use the machine twice a day for 16 minutes each time on speed 3. What a wonderful way to exercise.—*Robert M.*

I am in my late 80's and have diabetes. The first thing I noticed when I started using my machine was that my feet were warm when I went to bed. They were always ice cold before. Because one of my problems is poor circulation, I use the machine three times a day for 10 minutes each; in the morning, late afternoon and just before bed. I almost forgot to mention that I have not been able to lift my arms above my head. Now I can do it. You think that's no big deal until you can't do it anymore. —*Ralph K.*

As a Chiropractor, I would like to say that the Exerciser 2000 Elite™ enables people to benefit themselves at home. It is a valuable asset in moving lymph fluid, oxygenating the blood, increasing immune system function, maintaining mobility in the spine, and additionally freeing up a spine that has become stiff and arthritic. —*Garry Gorsuch, D.C.*

I love using the Exerciser 2000 Elite™ after my morning workout. It is an excellent way to cool down and it helps to start my day off right.—*Deanna C., Kansas*

My husband and I have been into natural products all of our lives but nothing has ever affected us like the Exerciser 2000 Elite™. My husband is 72 and delivers flowers. He carries 5 gallon buckets of water. Since using the machine, his back hasn't hurt him at all. My hips would hurt if I stood too long and I would get weak and have to sit down. Now I can walk and sit as long as I want. I don't take pain medication anymore. In the morning, when I get out of bed I'm not stiff anymore. At 65, wow, this is great! Thank you for offering such a great machine. We are going to tell everyone we know about it. —*Cheryl J.*

The ad I saw almost sounded "too good to be true". With your no risk money back guarantee I figured I had nothing to lose so I purchased the machine… and boy, am I glad I did! I am 75 years old and suffer from sciatica, which makes my back and legs tighten up and causes numbness. I was taking 8-10 Aleve™ every day. After using the machine for only 4 minutes, I noticed my lower back loosening up. Since I have been using the machine I haven't taken any pain pills and have been pain free. My sciatica is not giving me problems anymore and my body stays loosened up. I have also had a snoring problem for quite some time, however, since using the machine my snoring has subsided. My wife is so excited! I cannot tell you how much this machine has turned my life around. —*C. Cummings*

I have had constipation problems for over 25 years. Since I have been using the Exerciser 2000 Elite™ I have been regular every day and have begun to lose weight. This is truly a blessing and is so easy to use. —*Jeannie*

I had suffered with sleep apnea for many years and had been taking drugs for it. I was told I would have to use a breathing apparatus. In the meantime, I was introduced to the Exerciser 2000 Elite™ and decided to purchase one. Within two weeks, I was sleeping more deeply and restfully than ever before. —*David B.*

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NEW

By John Fleming

For many of us, nothing is more relaxing than a long, luxurious bath. Unfortunately, because of safety concerns, many people, particularly older people, have to forego this simple pleasure. Sure, you can spend big bucks to remodel your bathroom to provide a bathtub you can use, but who wants to do that? Now there's a better way, and it lets you use the bath that's in your home today.

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Hydroxatone® Vs. Other Products

Hydroxatone® is a real Botox®* alternative without the same risks associated with Botox®*. There have been a number of anti-wrinkle products introduced over the last few years. Few of these provide valid scientific evidence that they provide real results. The leading bio-chemist that developed Hydroxatone® with Dr. Fiorillo decided to incorporate the three leading and complimentary anti-wrinkle ingredients into Hydroxatone® (Argireline®5, Matrixyl™ 3000[3], and Hyaluronic Acid) to provide real results. Hydroxatone® was the first to combine these three, resulting in the unrivaled scientifically advanced anti-wrinkle product on the market.

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Unless you've actually tried Hydroxatone®, it's hard to imagine it can work the miracles users claim it does. But women and men of all ages are using Hydroxatone® and seeing real and noticeable results every day. The cumulative results that are seen within two weeks will continue with daily use. Over six months this will increase to as much as 68% reduction in deep wrinkles.

Why Hydroxatone® Is So Effective

Hydroxatone® is unlike any other skin cream you've ever tried because it relies on THREE proven ingredients: Matrixyl™ 3000[3], Argireline®5 and Hyaluronic Acid. But Hydroxatone® doesn't stop there! It also includes other natural antioxidants, botanicals, vitamins, and peptides... designed to nourish your skin while fading wrinkles.

Advanced Anti-Wrinkle Results

- 68% Reduction Of Deep Wrinkles In Just 6 Months
- Diminished Age Spots & Increased Suppleness
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- Tightened And Toned Skin

"Within two weeks of using Hydroxatone®, I was getting compliments on my skin from friends and co-workers. My skin not only feels great, but it looks great too! You've made me a Hydroxatone® believer!"

Results not typical

— Robin B., Los Angeles

Matrixyl™ 3000[3] – is clinically tested to promote collagen production in the skin.

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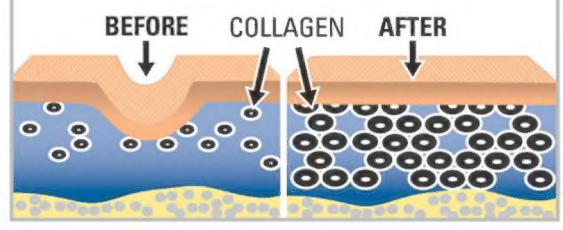

There Is No Comparison

Forget Botox®* or any other radical and dangerous treatments. Throw out other creams that simply don't work! Hydroxatone® is the anti-wrinkle cream that is proven. Within two weeks Hydroxatone® users will start to see results. With continued use, their skin will become softer, smoother, more radiant, and younger-looking...and that's GUARANTEED.

WHY CHOOSE HYDROXATONE®			
Products	Argireline®5 Acetyl Hexapeptide 3	Matrixyl™ 3000[3]	Hyaluronic Acid
Olay® Regenerist[1]	NO	NO	NO
Strivection SD®[2]	NO	YES	NO
La Mer™[4]	NO	NO	NO
Hydroxatone®	YES	YES	YES

"I'm 51 years old and my skin hasn't looked and felt this good in 15+ years. All the tiny wrinkles and lines have virtually disappeared. This product is fantastic."

-Rose P.

Results not typical

"I talk to so many women who would do almost anything to look younger. That is why I recommend Hydroxatone® to so many of my patients."

—Dr. Michael Fiorillo is a world renowned board certified plastic and reconstructive surgeon and codeveloper of Hydroxatone®.

Having A Hard Time Finding Hydroxatone® ?

For years consumers have only had expensive and ineffective alternatives to achieve younger looking skin. You may have seen other inferior anti-wrinkle products costing hundreds of dollars at some high priced salons and upscale department stores. The manufacturer of Hydroxatone® is so confident in their anti-aging treatment that they are offering a 30-day risk free trial offer...because seeing is believing!

Call today to get your supply of Hydroxatone® risk free, for just a small S&H fee. Our operators are available to let you try one of the greatest breakthroughs in wrinkle fighting technology without spending hundreds of dollars.

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Dream On

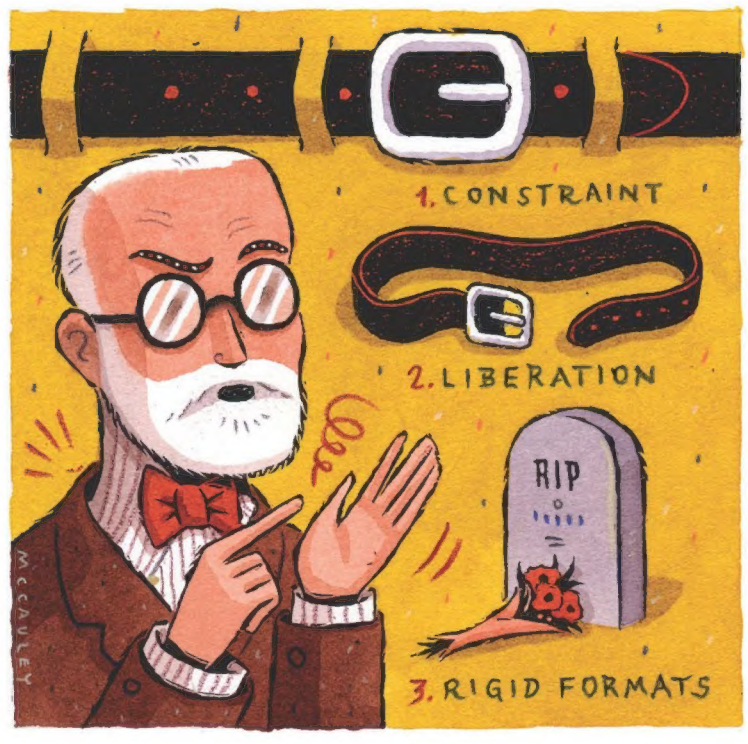
Why your nightmares hold the key to workplace success **BY DAVID MARTIN**

FROM: **HUMAN RESOURCES**
TO: **ALL STAFF**

Dear Employees,

We were very gratified by the positive response to last week's memo, "Cutting Medical Benefits: Healthy Companies Mean Healthy Employees."

This week, we'd like to turn our attention from physical to mental health. Many of you have left notes in our comments box reporting a "worrisome" increase in "unpleasant" work-related dreams. While you might be tempted to interpret these dreams yourself, this is something better left to professionals. What appears on the surface often has a deeper meaning. So, as another employee benefit, your HR department has compiled this guide to four of the most common workplace-related dreams:



❑ **THE DREAM:**

An annoying co-worker spends most of the morning talking your ear off about non-work-related matters. You get out of your chair, remove your belt, wrap it around his neck and choke him to death.

☑ **WHAT IT MEANS:**

The belt represents the workplace constraints that are keeping you from realizing your goals. Taking off your belt is a liberating move demonstrating a fresh approach to a traditional problem. By adopting a new management style, you can put to "death" the rigid work formats that have been holding back your creativity.

❑ **THE DREAM:**

Your boss is lecturing you on how to enhance your productivity. Suddenly, you undo your tie and gag him with it.

☑ **WHAT IT MEANS:**

Are you frustrated by conventional approaches that don't seem to produce results? By taking off your tie, you demonstrate a desire to "undo" conventional limitations and "silence" outmoded problem-solving methods. You should candidly discuss possible new approaches with your boss.

❑ **THE DREAM:**

You go to the break room to pour yourself a cup of coffee. You see Sandy from marketing pouring the last cup and leaving the carafe empty. You politely ask her to make a new pot, but she just laughs in your face. You wrench the coffee cup from her hand, sprint back to your office and perform a victory dance.

☑ **WHAT IT MEANS:**

Coffee often symbolizes the need to stimulate new ideas. The fact that you seized an opportunity suggests that there is tremendous creative energy locked within you waiting to be released. Have you considered a career in marketing?

❑ **THE DREAM:**

The office photocopier jams. You open up all the panels, trying to find the cause of the problem. After 40 minutes of pointless searching, you throw the photocopier out the window and watch it smash to pieces on the pavement below.

☑ **WHAT IT MEANS :**

A machine that copies documents clearly represents the inner voice that is inhibiting you from pursuing "original" ideas. But you feel that you have proven yourself able to thoroughly "deconstruct" any problem and are not afraid to shy away from unconventional solutions.

DAVID MARTIN's *essay "Domestic Bliss" appeared in the December 2007 issue of* SMITHSONIAN.

ADAM MCCAULEY